

A Stereo-Atlas of Ostracod Shells

edited by J. Athersuch, D. J. Horne, J. W. Neale,
and David J. Siveter

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Instructions to Authors

Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

The front cover shows a male right valve of *Semicytherura striata* (Sars) from intertidal algae collected at Blue Anchor, Somerset SW England. Photograph by Dr J. E. Whittaker, British Museum (Natural History), London.

ON *LOXOCONCHA PRAEPONTICA PRAEPONTICA* MAYBURY & WHATLEY subsp. nov.

by Caroline A. Maybury & Robin C. Whatley
(University College of Wales, Aberystwyth)

Loxoconcha praeopontica praeopontica subsp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12866**; ♀ LV.

[Paratypes: British Museum (Nat. Hist.) nos. **OS 12867–OS 12870**].

Type locality: Shell-rich sand, Le Temple du Cerisier, SW of Rennes (approx. lat. 48° 07' N, long. 1° 41' W), NW France; Redonian, Upper Pliocene.

Derivation of name: Latin, with reference to the similarity and probable ancestral relationship of the subspecies to *Loxoconcha pontica* Klie (Mitt. Kgl. Naturw. Inst., 10, 13, figs. 24–30, 1937).

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12866** (holotype, ♀ LV: Pl. 15, 2, fig. 1), **OS 12867** (paratype, ♀ RV: Pl. 15, 2, fig. 2), **OS 12868** (paratype, ♂ LV: Pl. 15, 2, fig. 3; Pl. 15, 4, figs. 3, 4), **OS 12869** (paratype, ♂ RV: Pl. 15, 4, fig. 1), **OS 12870** (paratype, ♀ RV: Pl. 15, 4, fig. 2).

All paratypes from the same sample as the holotype, except **OS 12868** which is from fine, glauconitic, grey sand, depth 26.7–32.4m, Apigné (Borehole II), SW of Rennes (approx. lat. 48° 07' N, long. 1° 41' W, NW France; Redonian, Upper Pliocene. See J.-P. Margerel, *Les Foraminifères du Redonien, Systématique, Répartition stratigraphique, Paléoécologie*, Nantes, 1, 8–26, 1968 for further geographical and sample details.

Explanation of Plate 15, 2

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12866**, 510µm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12867**, 510µm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12868**, 560µm long).

Scale A (100µm; × 114), figs. 1–3.

Stereo-Atlas of Ostracod Shells 15, 3

Loxoconcha praeopontica praeopontica (3 of 4)

Diagnosis: A small to medium subspecies of *Loxoconcha* with very prominent sieve-type normal pores, commonly contained within circular rims; wide anteroventral flange; weakly reticulate and finely punctate secondary ornament. The valves, especially those of the female, are tumid anteroventrally.

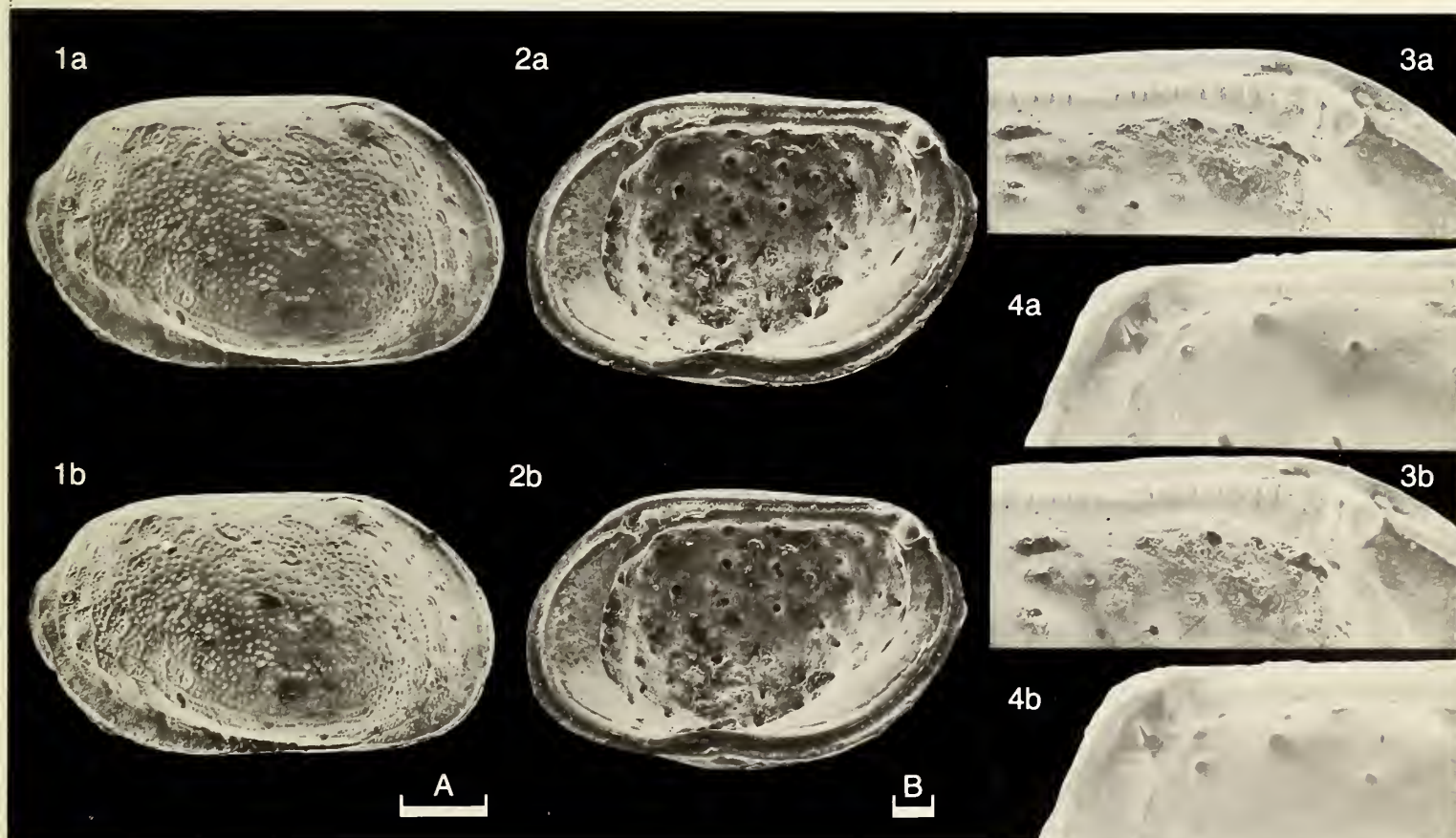
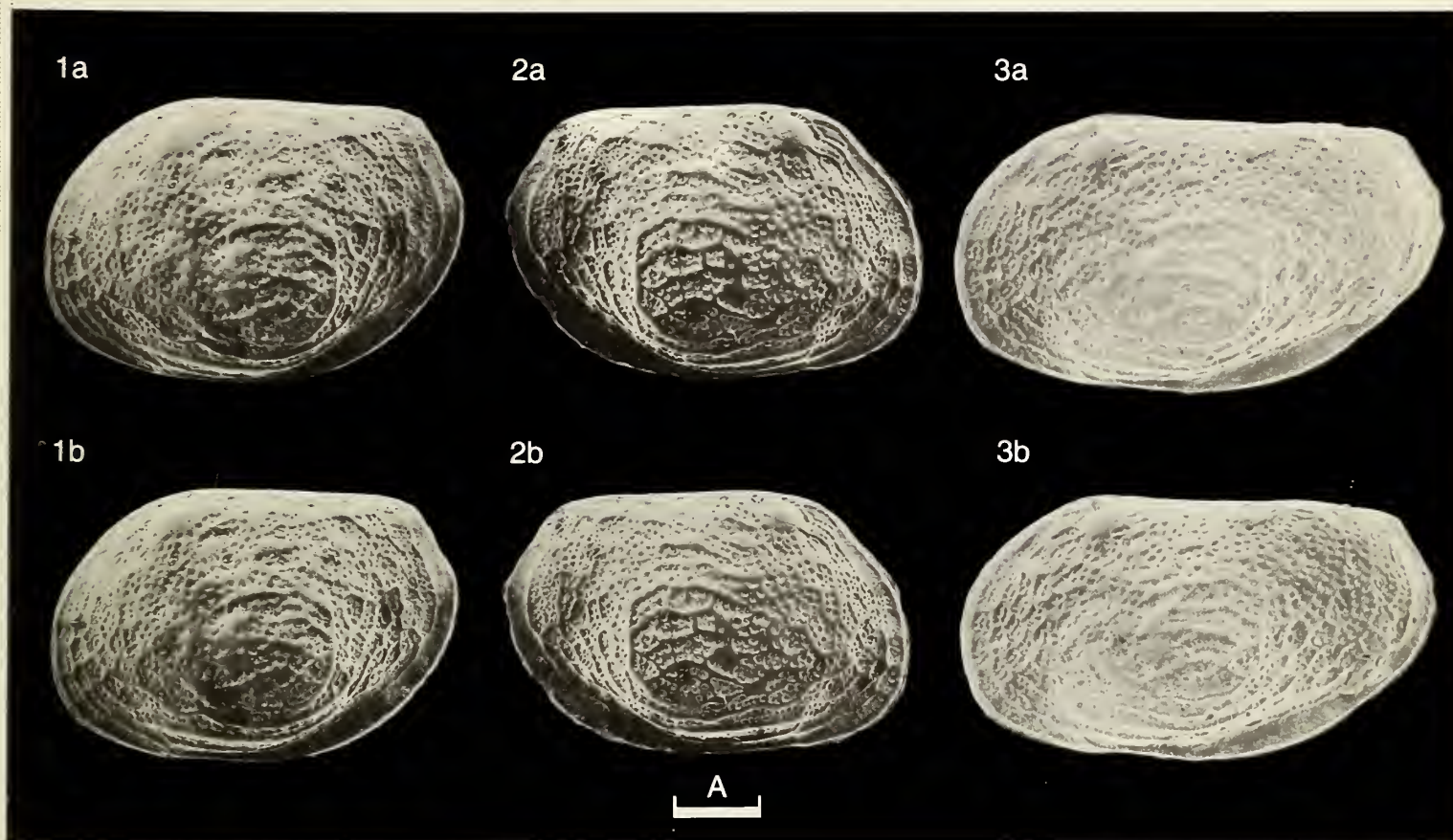
Remarks: The male of *Loxoconcha pontica* Klie (a Recent species from the central and eastern Mediterranean, Adriatic, Aegean, Black and Azov Seas) is similar in length and shape to the male of the new subspecies but is less high. The male left valve is also more inflated ventrally (see J. Athersuch, *Stereo-Atlas Ostracod Shells*, 7, 53–60, 1980). The female of the new subspecies differs in outline, is less elongate and is strongly inflated ventrally. The ornament of Klie's species is very similar to that of *L. praeopontica praeopontica* but is less pronounced; the sieve plates are smaller and less conspicuous. Overall the features of the present subspecies indicate a probable ancestral relationship to *L. pontica*. The only fossil record of *L. pontica* Klie is by Mostafawi (*Meyniana*, 33, 165, pl. 11, figs. 12–15, 1981) from the late Pliocene of Kos, Greece. In our opinion, this is not conspecific with *L. pontica* of Klie in that it differs in shape (it is much less elongate and less pointed posteriorly) and in details of ornament (it possesses a delicate reticulum of polygonal units posteriorly). Mostafawi's species, which we regard as new, more closely resembles *L. praeopontica sensu lato* than *L. pontica* Klie but differs from the former in that the female and the left valve of the male lack the pronounced ventral tumidity.

Distribution: *L. praeopontica praeopontica* has been recovered from the Redonian (Upper Pliocene) deposits of Apigné (Gîte d'Apigné, Borehole II, Le Temple du Cerisier), L'Aubier and Le Bosq d'Aubigny (Manche), NW France (see J.-P. Margerel, *op. cit.* for sample details).

Explanation of Plate 15, 4

Fig. 1, ♂ RV, ext. lat. (paratype, **OS 12869**, 560µm long); fig. 2, ♀ RV, int. lat. (paratype, **OS 12870**, 460µm long); figs. 3, 4, ♂ LV, (paratype, **OS 12868**, 560µm long): fig. 3, ant. hinge element; fig. 4, post. hinge element.

Scale A (100µm; × 114), figs. 1, 2; scale B (20µm; × 237), figs. 3, 4.



ON *LOXOCONCHA PRAEPONTICA MAGNA*
MAYBURY & WHATLEY subsp. nov.

by Caroline A. Maybury & Robin C. Whatley
(University College of Wales, Aberystwyth)

Loxoconcha praepontica magna subsp. nov.

Holotype: British Museum (Nat. Hist.) no. OS 12871; ♀ LV.

[Paratypes: British Museum (Nat. Hist.) nos. OS 12872 – OS 12875].

Type locality: Mixed sample, Sample No. 1, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, referring to the greater size of this subspecies relative to the nominate subspecies, *Loxoconcha praepontica praepontica* Maybury & Whatley (*Stereo-Atlas Ostracod Shells*, 15, 1–4, 1988).

Explanation of Plate 15, 6

Fig. 1, ♀ LV, ext. lat. (holotype, OS 12871, 640 µm long); fig. 2, ♀ RV, ext. lat. (paratype, OS 12872, 640 µm long); fig. 3, ♂ RV, ext. lat. (paratype, OS 12874, 630 µm long).

Scale A (200 µm; × 100), figs. 1–3.

Figured specimens: British Museum (Nat. Hist.) nos. OS 12871 (holotype, ♀ LV: Pl. 15, 6, fig. 1), OS 12872 (paratype, ♀ RV: Pl. 15, 6, fig. 2), OS 12874 (paratype, ♂ RV: Pl. 15, 6, fig. 3), OS 12873 (paratype, ♀ LV: Pl. 15, 8, fig. 1), OS 12875 (paratype, ♀ RV: Pl. 15, 8, figs. 2–4).

Specimen OS 12872 is from the same sample as the holotype and specimens OS 12873, OS 12874, and OS 12875 are from the type locality and type horizon, Sample Nos. 7, 29 and 13 respectively. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and North West France*, unpubl. PhD thesis, Univ. Wales, 1, 4–5, 1985 for sample details.

Diagnosis: A medium, punctate, subovate subspecies of *Loxoconcha praepontica* with a faint reticulation peripherally around free margins, proximal to the flange. Puncta largest medianly which area is also 'wrinkled' due to the development of weak, subhorizontal muri. Sieve plates conspicuous. Internal features as for the genus.

Remarks: This subspecies can be distinguished from *Loxoconcha praepontica praepontica* by its larger size, its lack of pronounced tumidity posteroventrally and its more regularly ordered ornament of coarser puncta and less prominent reticulum. Both subspecies possess prominent sieve plates and are punctate with weakly developed reticulae. The two subspecies are exclusive to the Upper Pliocene; *L. praepontica magna* is found in Cornwall and *L. praepontica s.s.* in NW France.

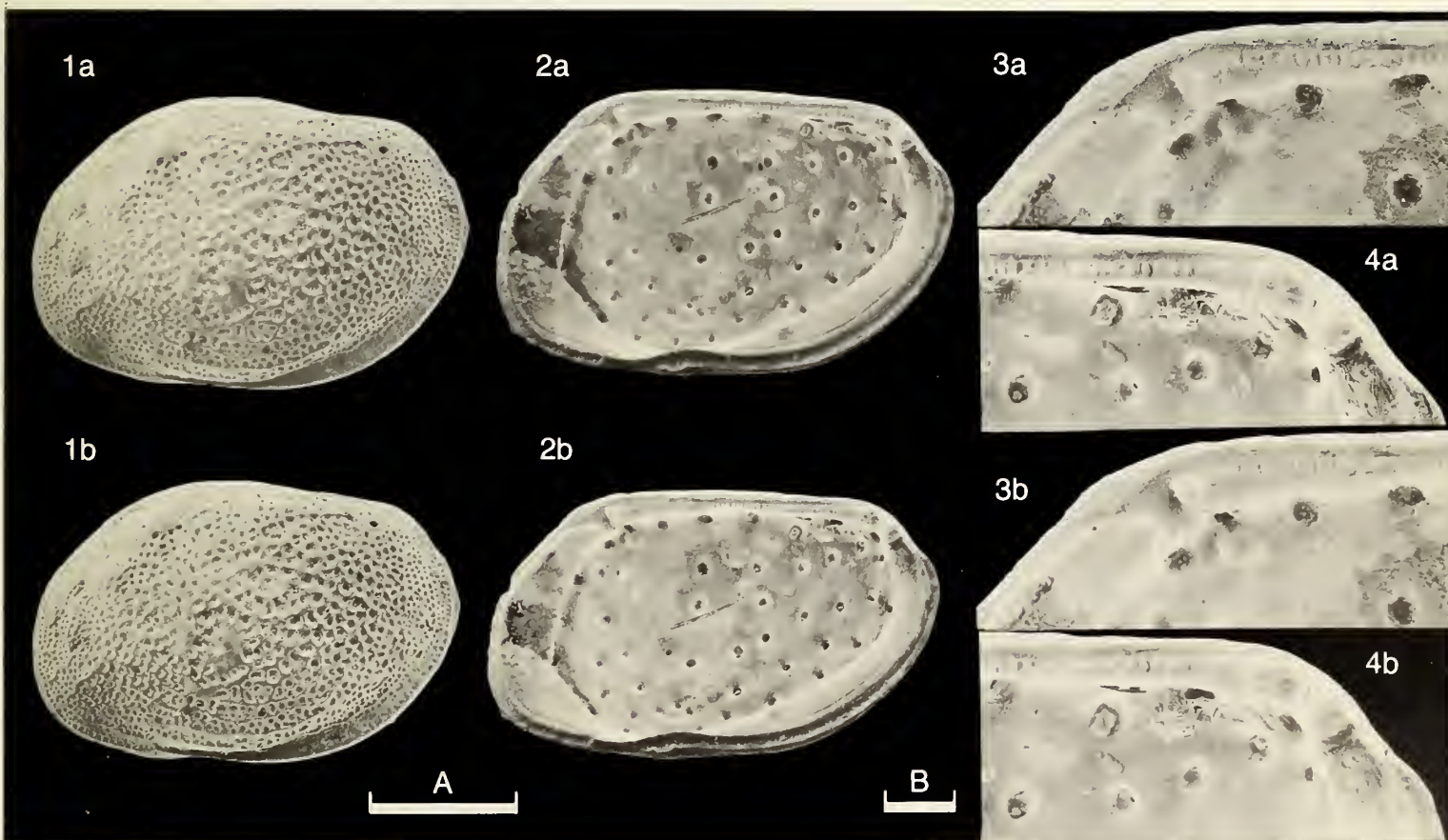
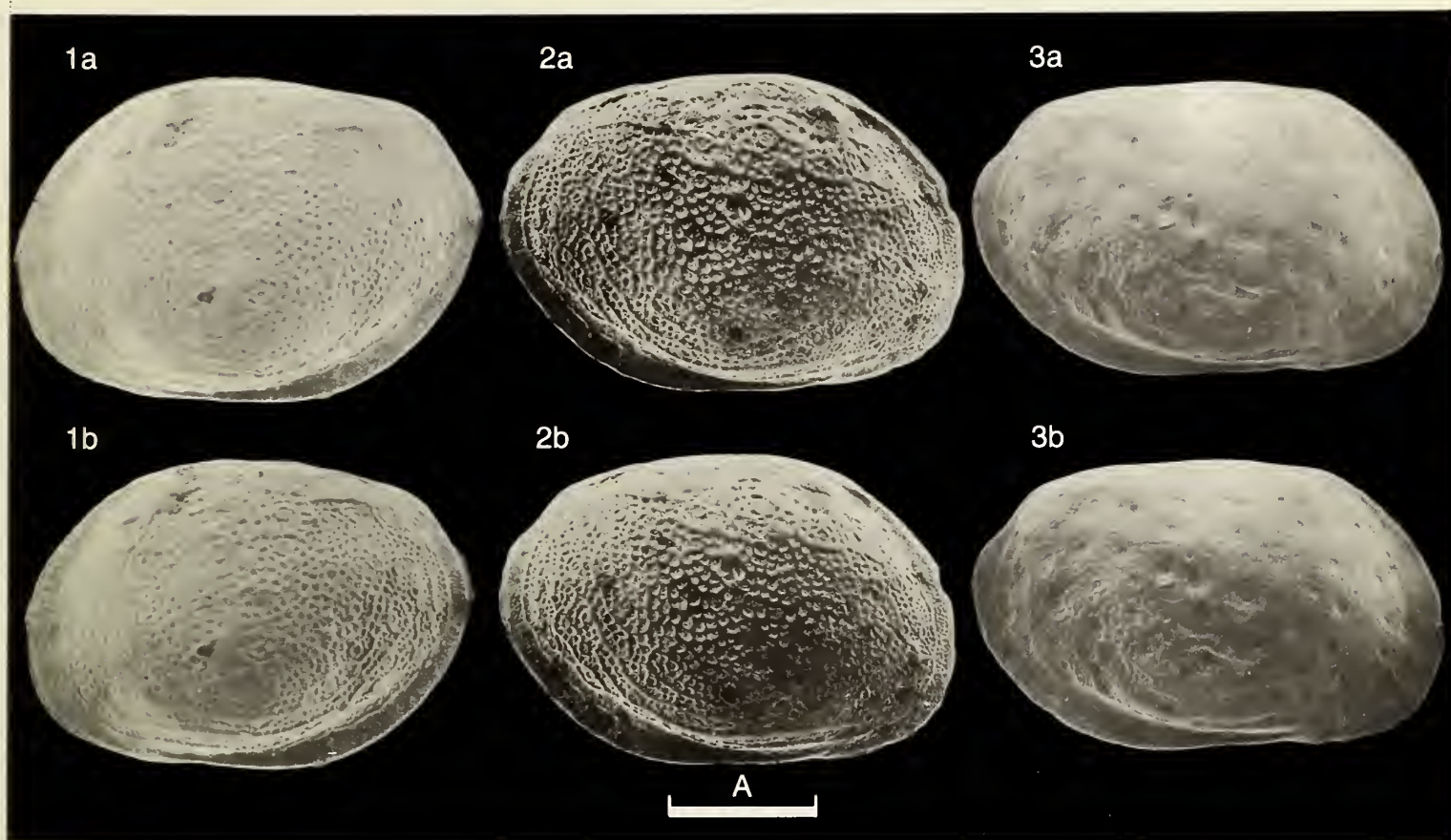
The differences between *L. pontica* Klie and *L. praepontica praepontica* are outlined in Maybury & Whatley (*Stereo-Atlas Ostracod Shells*, 15, 1–4, 1988).

Distribution: This subspecies is confined to the Upper Pliocene deposits of St. Erth, Sample Nos. 1, 7, 13–14, 21, 23, 25–29 (see C. Maybury, *op. cit.* for sample details).

Explanation of Plate 15, 8

Fig. 1, ♀ LV, ext. lat. (paratype, OS 12873, 600 µm long); fig. 2–4, ♀ RV (paratype, OS 12875, 640 µm long); fig. 2, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element.

Scale A (200 µm; × 100), figs. 1, 2; scale B (40 µm; × 244), figs. 3, 4.



ON *LOXOCONCHA PARARHOMBOIDEA* WHATLEY & MAYBURY sp. nov.by Robin C. Whatley & Caroline A. Maybury
(University College of Wales, Aberystwyth)*Loxoconcha pararhomboidea* sp. nov.1980 *Loxoconcha rhomboidea* Fischer; I. P. Wilkinson, *Proc. Geol. Ass.*, **91**(4), pl. 2, fig. 6.*Holotype*: British Museum (Nat. Hist.) no. **OS 12876**; ♀ LV.[Paratypes: British Museum (Nat. Hist.) nos. **OS 12877–OS 12881**].*Type locality*: Mixed sample, Sample No. 1, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.*Derivation of name*: Latin, because of its close morphological relationship to *Loxoconcha rhomboidea* (Fischer) (Abh. bayer, Akad. Wiss., **74**, 656, 1855).*Figured specimens*: British Museum (Nat. Hist.) nos. **OS 12876** (holotype, ♀ LV: Pl. **15**, 10, fig. 1), **OS 12877** (paratype, ♀ RV: Pl. **15**, 10, fig. 2), **OS 12878** (paratype, ♂ RV: Pl. **15**, 10, fig. 3), **OS 12879** (paratype, ♀ RV: Pl. **15**, 12, fig. 1), **OS 12880** (paratype, ♀ LV: Pl. **15**, 12, fig. 2), **OS 12881** (paratype, ♀ LV: Pl. **15**, 12, fig. 3).Specimens **OS 12877** and **OS 12878** are from the same sample as the holotype; specimen **OS 12879** is from the type locality and type horizon, Sample No. 29 (blue clay) (see C. Maybury,

Explanation of Plate 15, 10

Fig. 1, ♀ LV, ext. lat. (holotype **OS 12876**, 530 µm long); fig. 2, ♀ RV, ext. lat. (paratype **OS 12877**, 550 µm long); fig. 3, ♂ RV, ext. lat. (paratype **OS 12878**, 600 µm long).

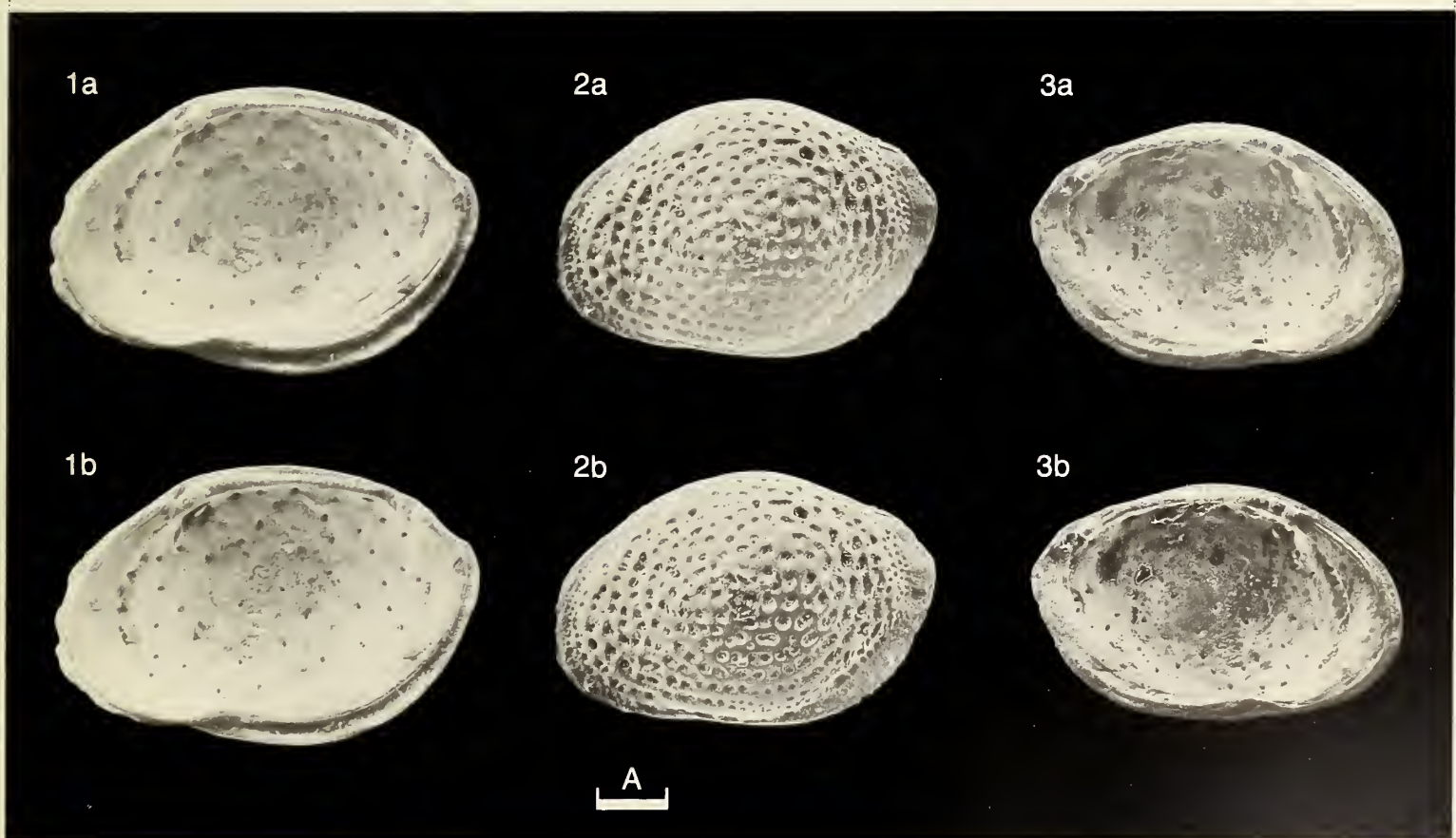
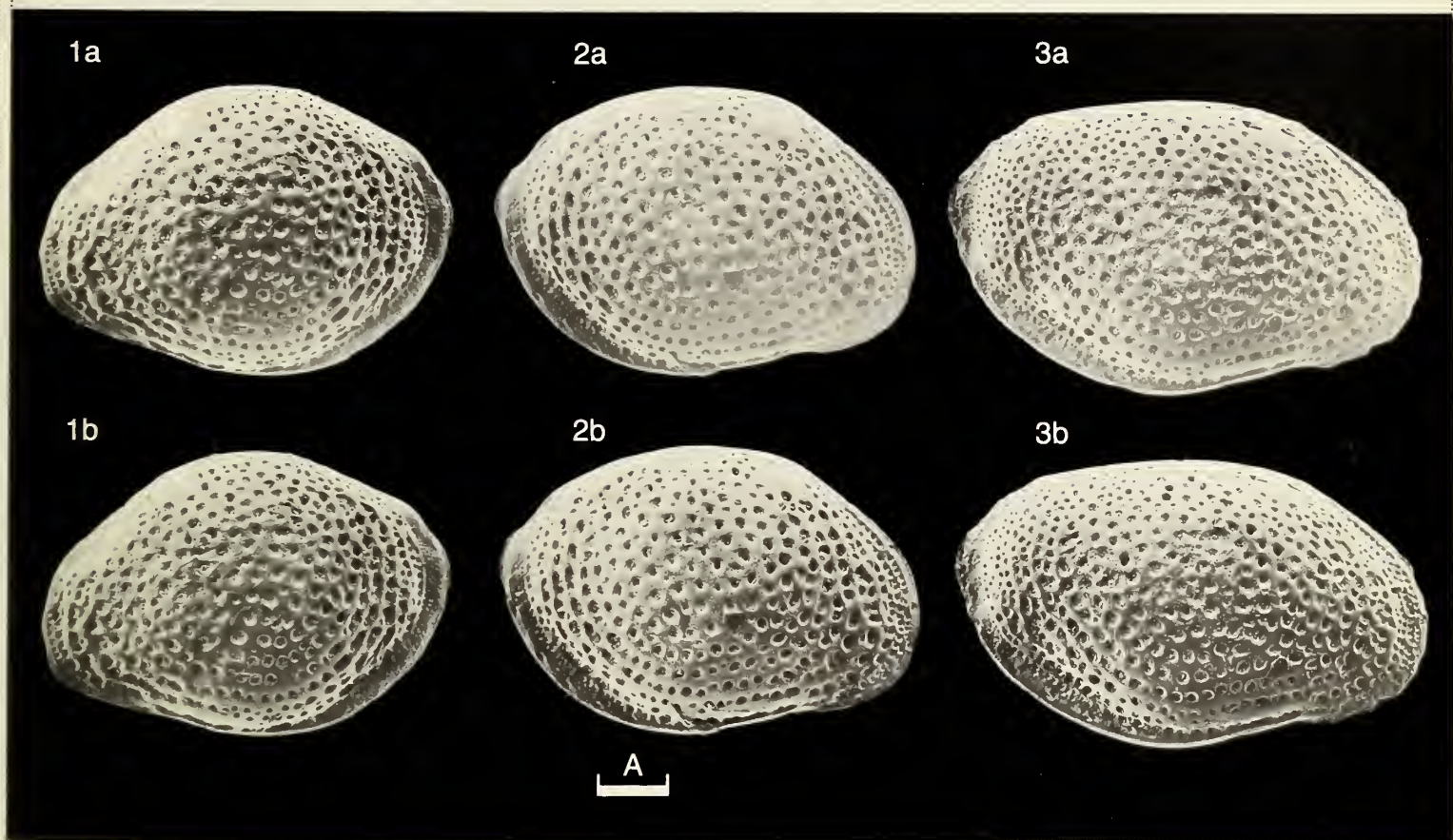
Scale A (100 µm; ×108), figs. 1–3.

Figured specimens (cont.): *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and North West France*, unpubl. PhD thesis, Univ. Wales, **1**, 4–5, 1985 for sample details). Specimens **OS 12880** and **OS 12881** are from a sample of yellow marl, the “cutting” at Palluau II (approx. lat. 46°48'N, long. 1°37'W) 50m SW of the Martineau pit, near Le Pas, NW France; Redonian, Upper Pliocene, (see J.-P. Margerel, *Les Foraminifères du Redonien, Systématique, Répartition stratigraphique, Paléoécologie*, Nantes, **1**, 8–26, 1968 for further details of the Palluau II sample).*Diagnosis*: Small to medium in size; like *Loxoconcha rhomboidea* but smaller, with a narrower posteroventral marginal rim and consistently larger punctae. Oral incurvature slight.*Remarks*: The Coralline Crag specimens described by Wilkinson (1980, *op. cit.*) as *L. rhomboidea* are conspecific with the present material. The length of the female left valve (543 µm) in Wilkinson's material approximates more closely to that of the new species (470–530 µm long) than to *L. rhomboidea* (585–659 µm long, see J. Athersuch and J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, **3**, 81–90, 1976).British and French Pliocene specimens differ in size. Adult French specimens are always smaller than their British counterparts; a difference likely to have arisen as a consequence of geographical separation. Compare the British specimens illustrated in Pl. **15**, 10, figs. 1–3 and Pl. **15**, 12, fig. 1 with the French examples in Pl. **15**, 12, figs. 2, 3.*Distribution*: This species has been recovered from the late Pliocene deposits of St. Erth (Sample Nos. 1–3, 7, 10–11, 13–14, 16, 18, 21, 23, 25–29) and the Redonian (Upper Pliocene) deposits of Apigné (Gîte d'Apigné, Borehole II, Le Temple du Cerisier), Beugnon (Sample No. 2), Le Bosq d'Aubigny, Le Pigeon Blanc, Palluau I, Palluau II and Saint-Jean-la-Poterie (Sample Nos. 1549.11–1549.12, 1549.15), NW France.

Explanation of Plate 15, 12

Fig. 1, ♀ RV, int. lat. (paratype **OS 12879**, 540 µm long); fig. 2, ♀ LV, ext. lat. (paratype **OS 12880**, 490 µm long); fig. 3, ♀ LV, int. lat. (paratype **OS 12881**, 470 µm long).

Scale A (100 µm; ×108), figs. 1–3.



ON *PALMOCONCHA HORNEI* MAYBURY & WHATLEY sp. nov.

by Caroline A. Maybury & Robin C. Whatley
(University College of Wales, Aberystwyth)

Palmoconcha hornei sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12855**; ♀ LV.

[Paratypes: British Museum (Nat. Hist.) nos. **OS 12856–OS 12860**].

Type locality: Shell-rich sand, Le Temple du Cerisier, SW of Rennes (approx. lat. 48° 07' N, long. 1° 41' W), NW France; Redonian, Upper Pliocene.

Derivation of name: In honour of Dr. David Horne in recognition of his studies of the Loxoconchidae.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12855** (holotype, ♀ LV: Pl. 15, 14, fig. 1), **OS 12856** (paratype, ♂ LV: Pl. 15, 14, fig. 2), **OS 12857** (paratype, ♂ RV: Pl. 15, 14, fig. 3), **OS 12858** (paratype, ♂ RV: Pl. 15, 16, fig. 1), **OS 12859** (paratype, ♀ car.: Pl. 15, 16, fig. 2), **OS 12860** (paratype, ♂ car.: Pl. 15, 16, fig. 3).

Specimens **OS 12856–OS 12858** are from the same sample as the holotype. Specimens **OS 12859–OS 12860** are from L'Orchère Pincourt (approx. lat. 47° 22' N, long. 0° 43' W), NW France; Redonian, Upper Pliocene (see J.-P. Margerel. *Les Foraminifères du Redonien, Systématique, Répartition stratigraphique, Paléoécologie*, Nantes, 1, 8–26, 1968 for further sample details).

Explanation of Plate 15, 14

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12855**, 450 µm long); fig. 2, ♂ LV, ext. lat. (paratype, **OS 12856**, 470 µm long); fig. 3, ♂ RV, ext. lat. (paratype, **OS 12857**, 480 µm long).

Scale A (100 µm; × 135), figs. 1–3.

Diagnosis: A small, subelliptical species of *Palmoconcha* with a broadly rounded anterior; caudate posterior; dorsal margin straight in males and female right valve, slightly arcuate in female left valve; ventral margin sinuous. Ornament of concentrically ordered reticulum peripherally and puncta medianly and ventromedianly. Marginal rim and eye spot smooth. Inner lamella with broad anterior and narrow posterior vestibula. Selvage in right valve very distal. Flange well developed. Hinge and muscle scars typical of the genus.

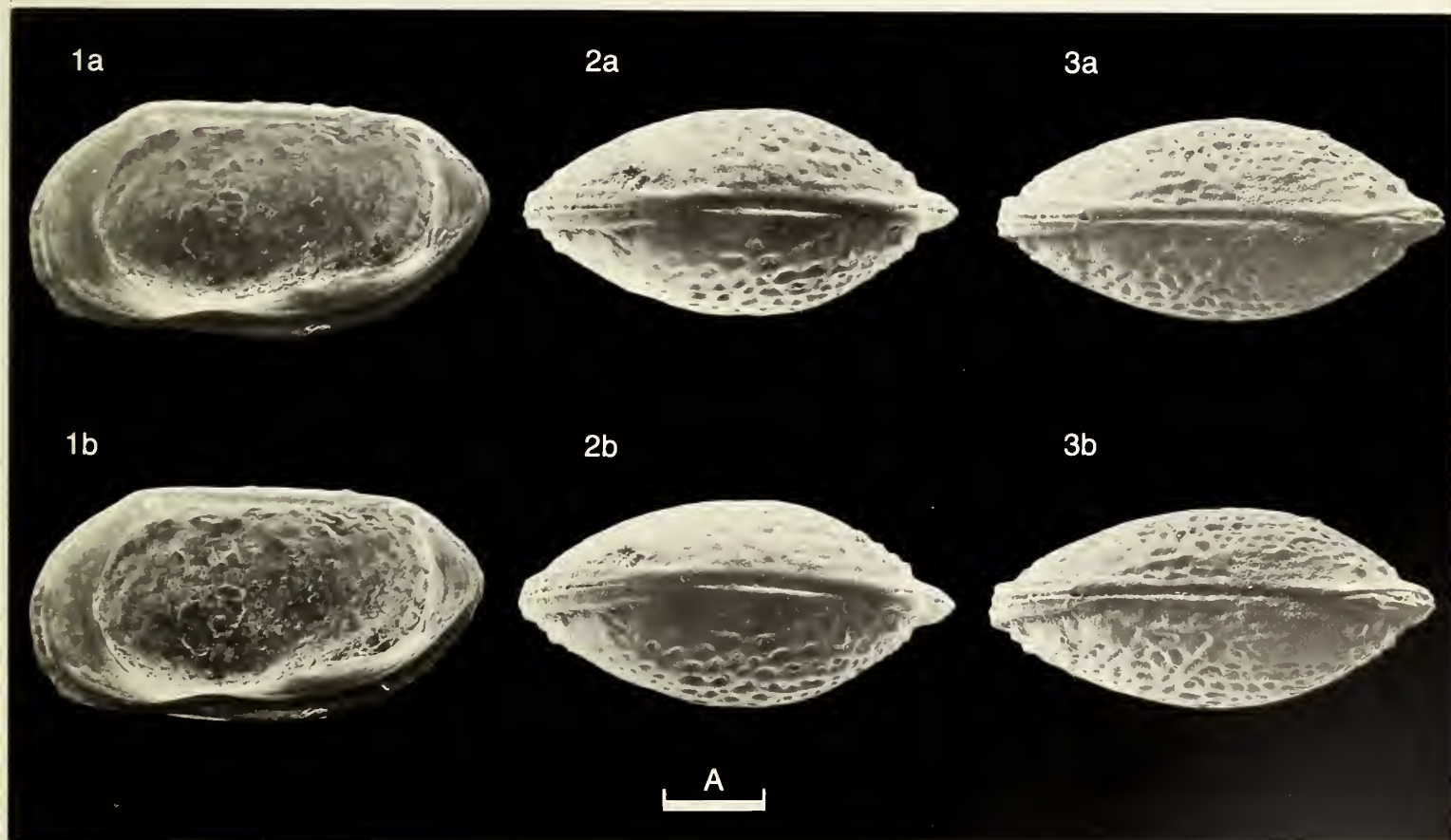
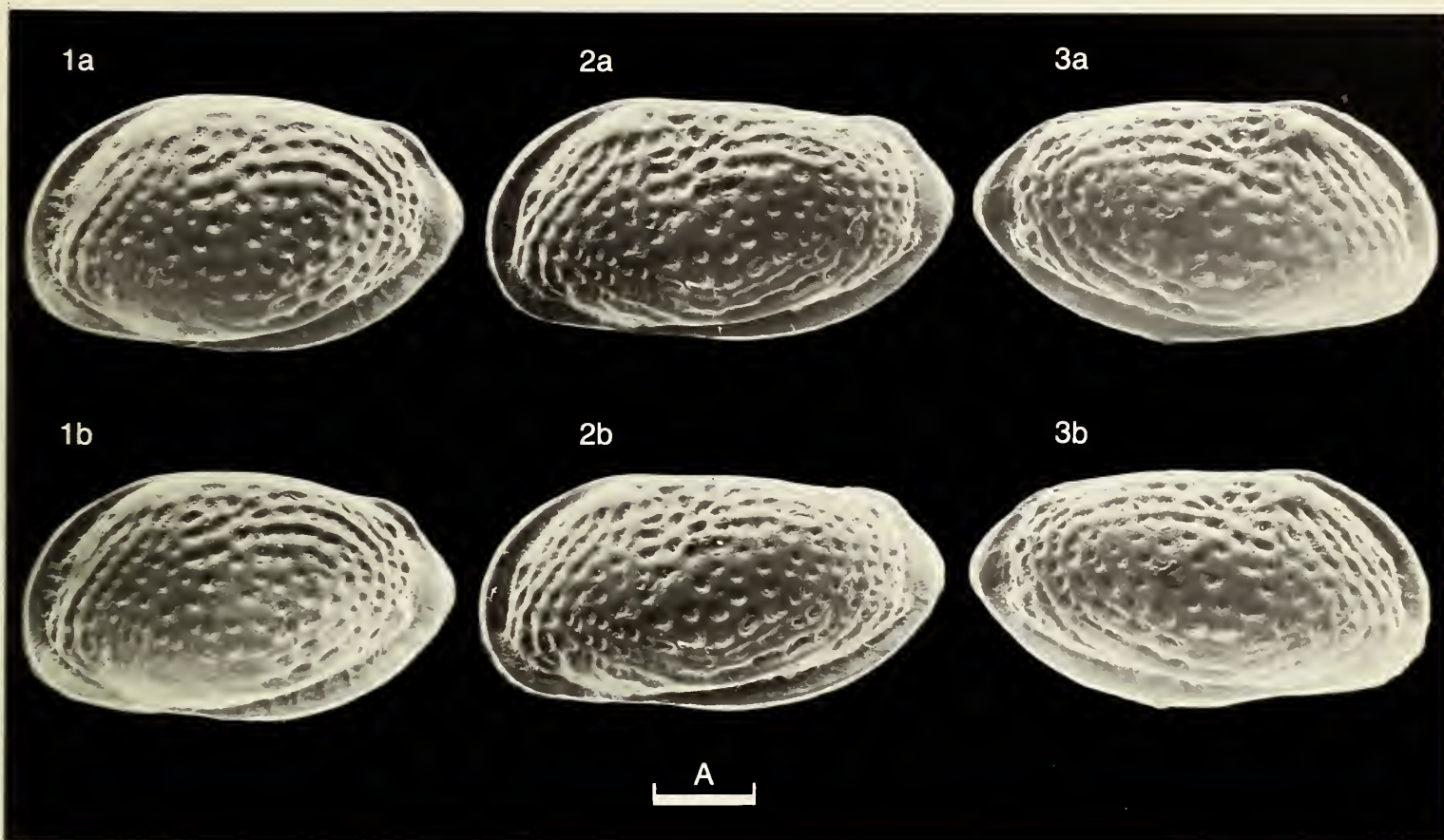
Remarks: In external carapace morphology *Palmoconcha hornei* and *P. edentonensis* (Swain, 1951) *sensu* Hazel, 1977 *non P. edentonensis* (Swain, 1951) (see J. E. Hazel, *J. Res. U.S. Geol. Surv.*, 5 (3), 377, 384, pl. 19, fig. f, 1977), a late Pliocene to early Pleistocene, N American species, are similar in lateral outline and in possessing a concentrically ordered reticulate ornament. The two species differ in size and ornamental detail. The species which Hazel illustrates (length of female left valve approx. 600 µm) is 25% longer than females of *P. hornei* and possesses concentrically ordered reticulae over its entire lateral surface except for the marginal rim which has a minutely punctate ornament, whereas in *P. hornei*, the valves are punctate medianly and ventromedianly and the marginal rim is smooth.

Distribution: This species has been recovered from the Redonian, Upper Pliocene deposits of Apigné (Gîte d'Apigné Borehole II, Le Temple du Cerisier), Bas Briacé, Beugnon (sample nos. 1, 2), Falleron, L'Orchère Pincourt and Le Pigeon Blanc NW France. A single female carapace of *P. hornei* has also been noted by the authors in a Miocene sample from Pontlevoy, NW France (see J.-P. Margerel *op. cit.* for the geographical, stratigraphical and sample details of the Redonian material).

Explanation of Plate 15, 16

Fig. 1, ♂ RV, int. lat. (paratype, **OS 12858**, 460 µm long); fig. 2, ♀ car., ext. dors. (paratype, **OS 12859**, 440 µm long); fig. 3, ♂ car., ext. dors. (paratype, **OS 12860**, 460 µm long).

Scale A (100 µm; × 135), figs. 1–3.



ON *WEBBYLLA CYMA*
SCHALLREUTER & SIVETER gen. et sp. nov.

by Roger E. L. Schallreuter & David J. Siveter
(University of Hamburg, West Germany &
University of Leicester, England)

Genus *WEBBYLLA* gen. nov.

Type-species: *Webbylla cyma* sp. nov.

Derivation of name: In honour of Dr. Barry D. Webby, University of Sydney, Australia.

Diagnosis: A genus of Drepanellidae with three bulb-like nodes at the dorsal border (N1, N3, N4), and a very weak forth node (N2) more or less completely fused with N1. N1 and N4 are connected ventrally by a crescent-shaped pseudovelum which ends in a blunt protuberance posteroventrally of N4. Anteriorly the pseudovelum continues in front of N1 and terminates near the dorsal border. N2, N3 and the pseudovelum almost completely encircle a more or less distinct muscle spot (=S2) which has a small, oblique sulcal-like continuation to the dorsal border between N1/2 and N3. Shell smooth or reticulate.

Remarks: The nearest relative of *Webbylla* is *Dominina* Burrett & Laurie, 1983 (*in* Burrett *et al.*, *Mem. Ass. Australas. Palaeontols.*, 1, 191, 1983) from the middle Ordovician of Tasmania. *Dominina* exhibits similar lobal features and also has a connection between N1 and N4 (*op. cit.*, fig. 15), but its pseudovelum lacks a posteroventral protuberance and is not present in front of N1 as in the more advanced, upper Ordovician *Webbylla*.

Explanation of Plate 15, 18

Fig. 1, car., lt. lat. (holotype, SUP 52900, 2.14 mm long); fig. 2, RV, ext. lat. (SUP 52901, 2.34 mm long); fig. 3, car., dors. (SUP 52902, 2.17 mm long).

Scale A (250µm; × 35), figs. 1, 2; scale B (250µm; × 25), fig. 3.

Webbylla cyma sp. nov.

? 1967 cf. *Kloedenia* sp.; G. H. Packham, *Aust. J. Sci.*, 30, 3, 106.

? 1969 cf. *Kloedenia fornicalis*; G. H. Packham *et al.*, *J. Geol. Soc. Aust.*, 16, 1, 98.

Holotype: University of Sydney, Australia; Palaeontology (SUP) no. 52900; carapace.
[Paratypes: SUP 52901 – 52906].

Type locality: Billabong Creek, Gunningbland – Parkes, western central New South Wales, Australia, 33° 11.5' S, 147° 59' E; Billabong Creek Limestone, lower Eastonian, upper Ordovician.

Derivation of name: Latin, *cyma*, young shoot, sprout; alluding to the ends of the pseudovelum.

Figured specimens: University of Sydney, SUP nos. 52900 (holotype, car.: Pl. 15, 18, fig. 1), 52901 (RV: Pl. 15, 18, fig. 2), 25902 (car.: Pl. 15, 18, fig. 3), 25903 (LV: Pl. 15, 20, fig. 1), 25904 (RV: Pl. 15, 20, fig. 2), 52905 (car.: Pl. 15, 20, fig. 3). All of the figured specimens are from the type locality.

Diagnosis: Species of *Webbylla* in which the anterior part of the pseudovelum extends anterodorsally to meet the dorsal border. Node N4 more prominent than N3; N2 confluent with N1 and is virtually obsolete. Marginal surface of valve is relatively narrow. Shell surface smooth. Valve length up to 2.34 mm.

Remarks: In an undescribed subspecies of *W. cyma* from the slightly older Gerybong Limestone Member of the Daylesford Limestone, Bowan Park, New South Wales, nodes N3 and N4 are nearly equally strongly developed and the pseudovelum ends a little below the dorsal border.

W. cyma differs from the older *W. reticulata* Schallreuter & Siveter, 1988 (*Stereo-Atlas Ostracod Shells*, 15, 21) in being smaller and in having unequally developed N3 and N4, a narrower marginal surface and a pseudovelum which reaches the dorsal border.

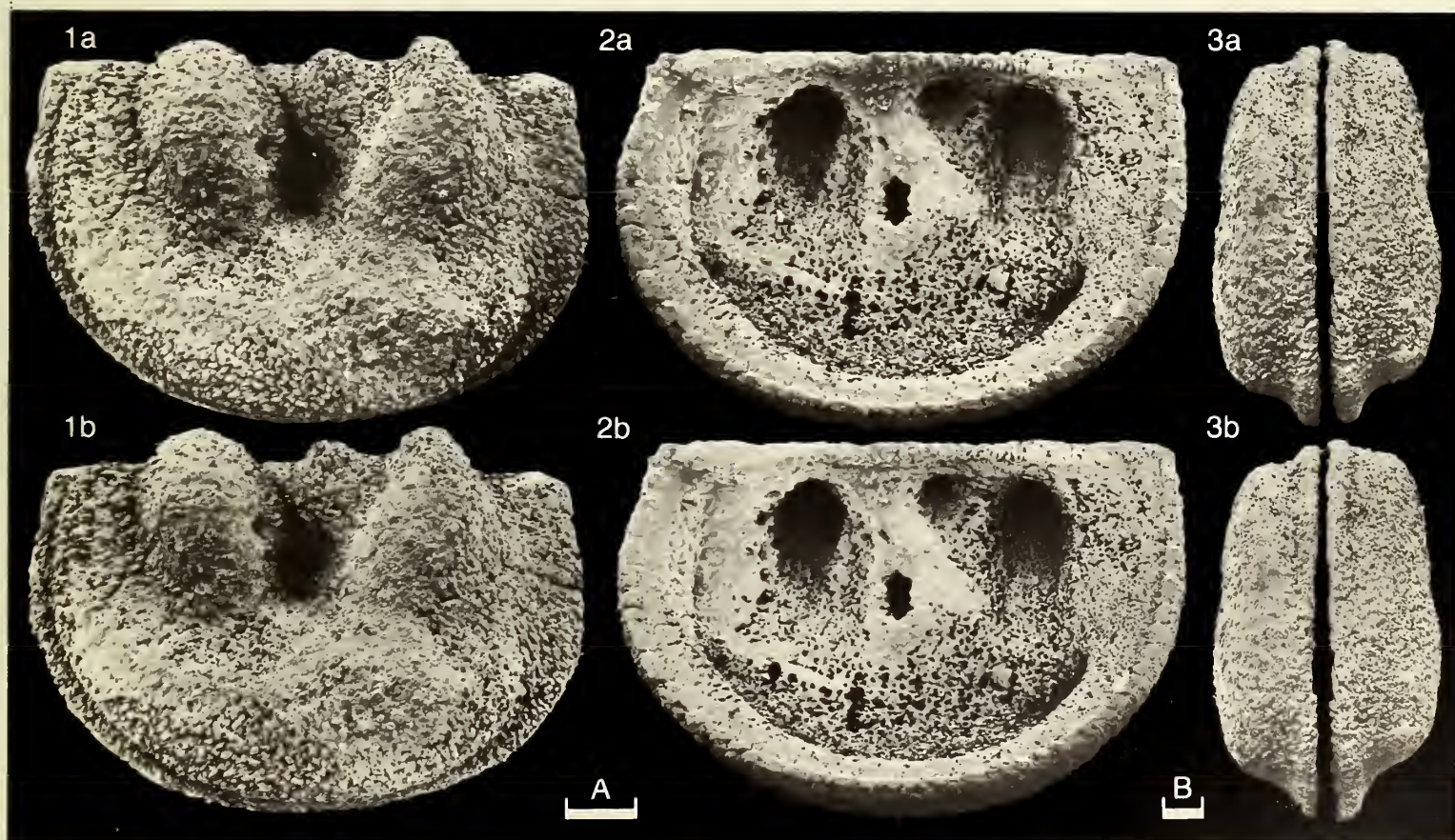
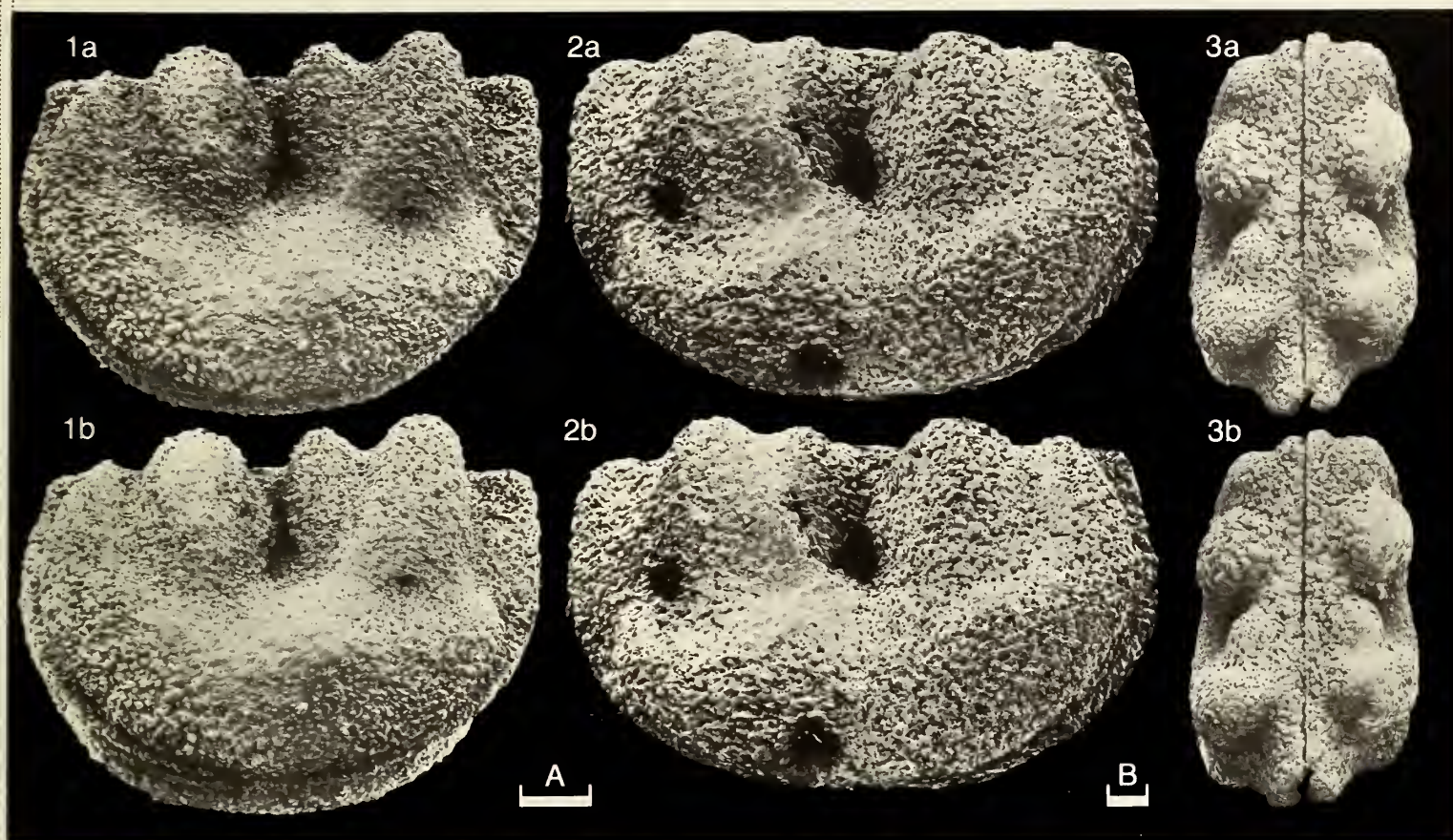
The present material is silicified. In nearly all specimens (more than 50 carapaces and 100 single valves) the muscle spot is broken (or not silicified?). The reason is unknown; often this part of the shell in palaeocopes is stronger than adjacent parts.

Distribution: Known, so far, only from the type locality.

Acknowledgement: We thank Dr. Barry Webby for sending us the material to study.

Explanation of Plate 15, 20

Fig. 1, LV, ext. lat. (SUP 52903, 2.18 mm long); fig. 2, RV, int. lat. (SUP 52904, 2.20 mm long); fig. 3, car., vent. (SUP 52905, 2.06 mm long).
Scale A (250µm; × 35), figs. 1, 2; scale B (250µm; × 25), fig. 3.



ON *WEBBYLLA RETICULATA* SCHALLREUTER & SIVETER sp. nov.

by Roger E. L. Schallreuter & David J. Siveter
(University of Hamburg, West Germany & University of Leicester, England)

Webbylla reticulata sp. nov.

Holotype: University of Sydney, Australia; Palaeontology (SUP) no. 52907; LV.
[Paratypes: SUP 52908–52912].

Type locality: About 1 km NE of Quondong Loc. BS5), Bowan Park, western New South Wales, Australia, 33°20'S, 148°56'E (see Semeniuk, V., *J. Proc. R. Soc. N.S.W.*, **103**, 16–17, 1970); Bourimble Limestone Member, Daylesford Limestone (upper Gisbornian or lower Eastonian), upper Ordovician.

Derivation of name: With reference to the partly reticulate shell.

Figured specimens: University of Sydney, SUP nos. 52907 (holotype, LV: Pl. 15, 22, fig. 1), 52908 (incomplete LV: Pl. 15, 22, figs. 2–4), 52909 (RV: Pl. 15, 24, fig. 1), 52910 (LV: Pl. 15, 24, fig. 2), 52911 (car.: Pl. 15, 24, fig. 3). All of the figured specimens are from the type locality and all are silicified.

Explanation of Plate 15, 22

Fig. 1, LV, ext. lat. (holotype, SUP 52907, 1.76 mm long). Figs. 2–4, ant. and posterovent. incomplete LV (SUP 52908, 1.64 mm long): fig. 2, ext. lat.; fig. 3, ext. lat. detail of muscle spot and impression of presumed accessory ant. muscle scar; fig. 4, ext. lat., slightly tilted, detail of ventral marginal surface.

Scale A (250 µm; ×45), fig. 1; scale B (250 µm; ×48), fig. 2; scale C (100 µm; ×65), figs. 3, 4.

Diagnosis: Species of *Webbylla* in which nodes N3 and N4 are about equally strongly developed and the anterior part of the pseudovelum ends some distance below the valve dorsal border. Valve marginal surface is relatively broad. Reticulation on the pseudovelum and also often on the nodes. Valve length up to 1.77 mm.

Remarks: *W. reticulata* is smaller than the type-species, *W. cyma* Schallreuter & Siveter, 1988 (*Stereo-Atlas Ostracod Shells*, **15**, 17) from the younger Billabong Creek Limestone of the Parkes Platform of western New South Wales. It is further distinguished by having nearly equally strongly developed N3 and N4, an anterodorsally shorter pseudovelum, a broader marginal surface and a partly reticulate shell.

An undescribed subspecies of *W. cyma* from the Gerybong Limestone Member of the Daylesford Limestone, which is younger than *W. reticulata* and older than *W. cyma cyma* (cf. Webby, B. D. & Morris, D. G., *J. Proc. R. Soc. N.S.W.* 109, 126, 1976) has an intermediate morphological position between *W. reticulata* and *W. cyma cyma*.

W. reticulata exhibits a small, pit-like impression in front of the non-reticulate muscle spot (Pl. 15, 22, figs. 2, 3). Such a feature was observed in *Platylolbina runica* by Schallreuter & Krüta (*Stereo-Atlas Ostracod Shells* **11**, 125, Pl. 11, 126, figs. 1, 3, 1984). It was considered to be the impression of an accessory muscle scar (*op. cit.*, **11**, 126).

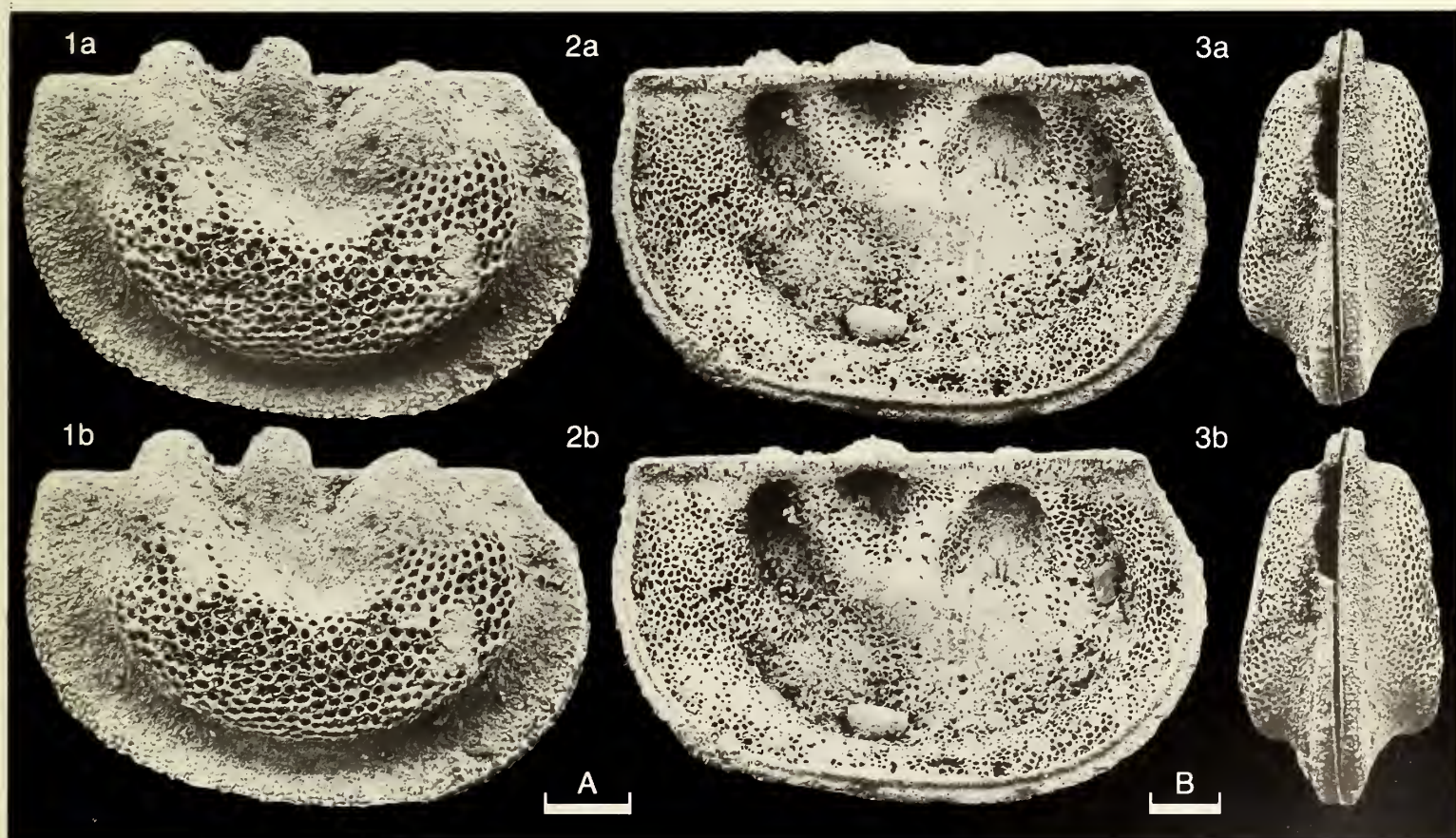
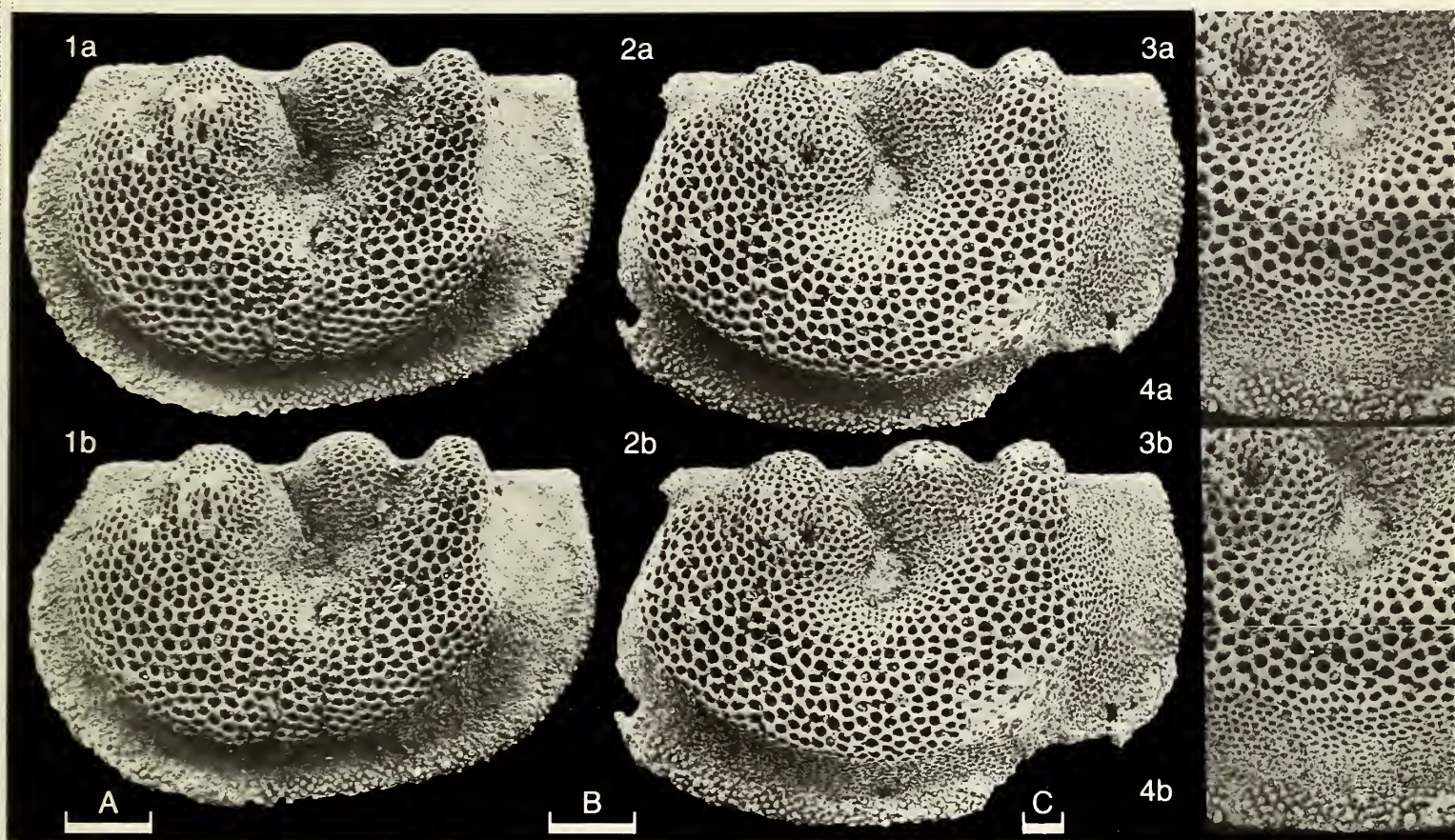
Distribution: So far known only from the type locality. The drepanellid *Pilla piformis* Schallreuter & Siveter, 1988 (*Stereo-Atlas Ostracod Shells*, **15**, 25) also occurs there.

Acknowledgement: We thank Dr Barry Webby, University of Sydney, for sending us the material to study.

Explanation of Plate 15, 24

Fig. 1, RV, ext. lat. (SUP 52909, 1.66 mm long); fig. 2, LV, int. lat. (SUP 52910, 1.61 mm long); fig. 3, car., vent. (SUP 52911, 1.34 mm long).

Scale A (250 µm; ×50), figs. 1, 2; scale B (250 µm; ×40), fig. 3.



ON *PILLA PIFORMIS*
SCHALLREUTER & SIVETER gen. et sp. nov.

by Roger E. L. Schallreuter & David J. Siveter
(University of Hamburg, West Germany & University of Leicester, England)

Genus *PILLA* gen. nov.
Type-species: *Pilla piformis* sp. nov.

- Derivation of name:* From the Greek *Pi*; resemblance of the pattern formed by the main nodes and pseudovelum, when turned through 180°, to the sixteenth letter of the Greek alphabet.
- Diagnosis:* A genus of Drepanellidae with two distinct bulb-like nodes (N1, N4) at the dorsal border and a very weak N2 fused with N1. N1 and N4 connected ventrally by a broad, crescent-shaped lobe-like pseudovelum which posteroventrally of N4 forms a rounded but somewhat pointed protuberance and which anteriorly extends in front of N1 to reach the dorsal border. N3 is lacking.
- Remarks:* *Pilla* is distinguished from the Australian genera, *Dominina* Burrett & Laurie (*in Burrett et al.*, *Mem. Ass. Australas. Palaeontols* 1, 191, 1983) and *Webbylla* Schallreuter & Siveter (*Stereo-Atlas Ostracod Shells* 15, 17, 1988) mainly by the lack of N3. It differs further from *Dominina* by the

Explanation of Plate 15, 26

Fig. 1, vent. incomplete RV, ext. lat. (holotype, SUP 52913, 1.59 mm long). Figs. 2–3, marginal incomplete RV (SUP 52914, 1.45 mm long): fig. 2, ext. lat.; fig. 3, ext. dors. Fig. 4, RV, ext. vent. (SUP 52915, 1.52 mm long).
Scale A (250 µm; × 50); figs. 1, 2; scale B (250 µm; × 30), figs. 3, 4.

- Remarks (cont.):* posteroventral protuberance and in having the pseudovelum present anteriorly. *Dominina*, *Webbylla* and *Pilla* are a closely related group of genera within the Drepanellidae. This group exhibits closer affinities to the typical North American representatives of the family such as *Drepanella* Ulrich, 1890 and *Scofieldia* Ulrich & Bassler, 1908 than to the European members such as *Duplexibollia* Schallreuter, 1987.

Pilla piformis sp. nov.

Holotype: University of Sydney, Australia; Palaeontology (SUP) no. 52913; RV.
[Paratypes: SUP 52914–52917].

Type locality: About 1 km NE of Quondong (Loc. BS5), Bowan Park, western New South Wales, Australia, 33° 20' S, 148° 56' E (see Semeniuk, V., *J. Proc. R. Soc. N.S.W.*, 103, 16–17, 1970); Bourimbla Limestone Member, Daylesford Limestone (upper Gisbornian or lower Estonian), upper Ordovician.

Derivation of name: As for the genus.

Figured specimens: University of Sydney, SUP nos. 52913 (RV: Pl. 15, 26, fig. 1), 52914 (RV: Pl. 15, 26, figs. 2, 3), 52915 (RV: Pl. 15, 26, fig. 4; Pl. 15, 28, figs. 2–4), 52916 (RV: Pl. 15, 28, fig. 1). All specimens are from the type locality and all are silicified.

Diagnosis: As for genus. *Pilla* is currently monotypic.

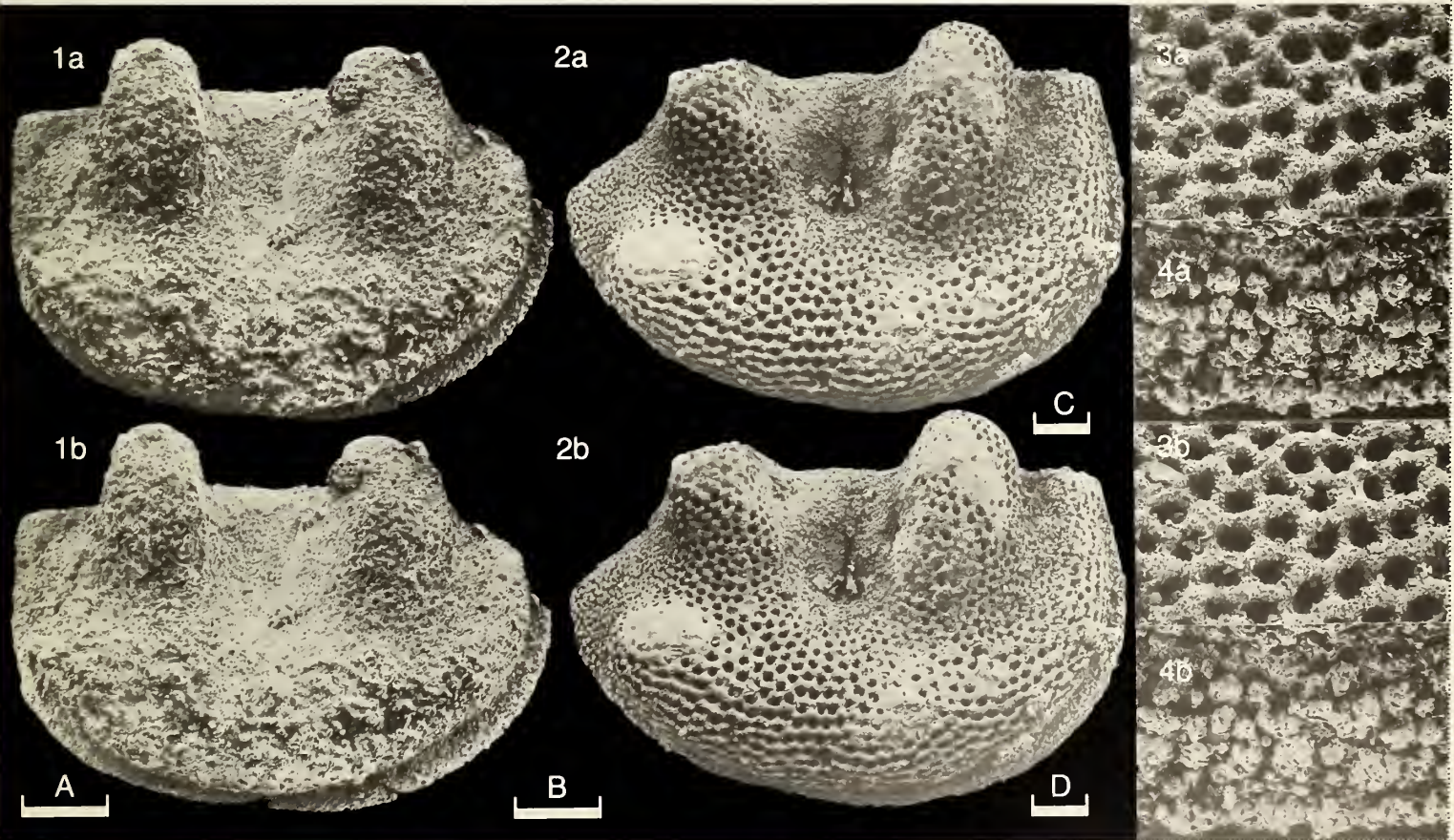
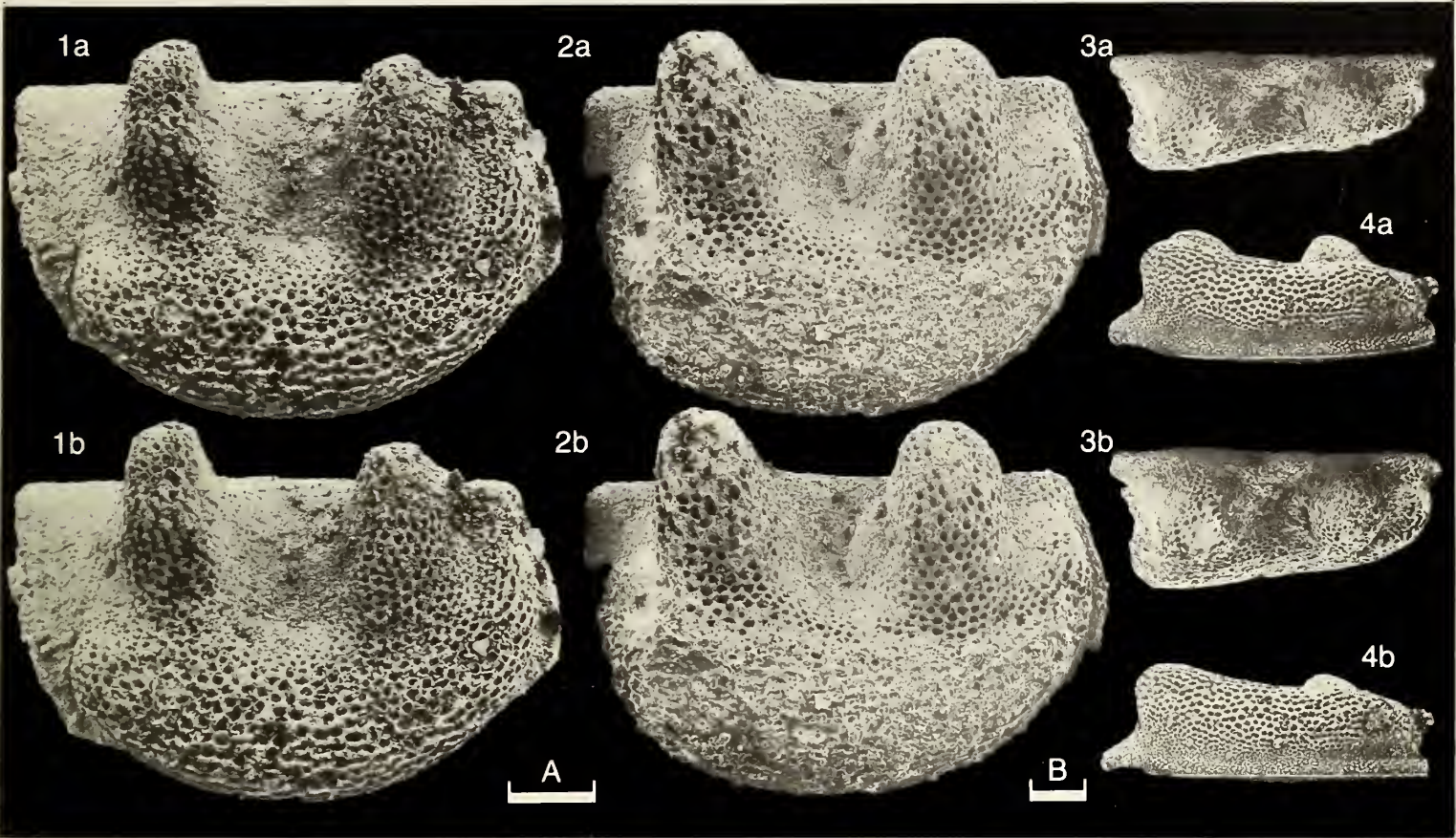
Remarks: The surface reticulation characteristic of this species has, unfortunately, been effaced from parts of some specimens (e.g. Pl. 15, 26, fig. 2; Pl. 15, 28, fig. 1) during preparation.

Distribution: So far known only from the type locality. The drepanellid *Webbylla reticulata* Schallreuter & Siveter, 1988 (*Stereo-Atlas Ostracod Shells*, 15, 21) also occurs there.

Acknowledgement: We thank Dr. Barry Webby, University of Sydney, for sending us the material to study.

Explanation of Plate 15, 28

Fig. 1, anterodors. incomplete RV, ext. lat. (SUP 52916, 1.71 mm long). Figs. 2–4, posterodors. incomplete RV (SUP 52915): fig. 2, ext. lat.; fig. 3, ext. lat. obl., detail of reticulation; fig. 4, ext. details of vent. marginal surface.
Scale A (250 µm; × 45), fig. 1; scale B (250 µm; × 50), fig. 2; scale C (50 µm; × 150), fig. 3; scale D (25 µm; × 300), fig. 4.



ON *TRICORNINA (BOHEMINA) PARAGRACILIS*
(BLUMENSTENGEL)

by Gerhard Becker
(University of Frankfurt, West Germany)

Tricornina (Bohemina) paragracilis (Blumenstengel, 1965)

- 1965 *Bohemina paragracilis* sp. nov. H. Blumenstengel, *Freiberger ForschHft.*, C 183, 18, pl. 2, figs. 1–6, pl. 14, figs. 1–3, tabs. 1, 6.
1982 *Tricornina (Bohemina) paragracilis*, Blumenstengel; G. Becker, *Palaeontographica*, A, 178, 146–147, pl. 9, figs. 11–18, tab. 1 (q.v. for full synonymy).
1988 *Tricornina (Bohemina) paragracilis*, Blumenstengel; G. Becker, *Geologisches Jahrbuch Hessen*, 116, pl. 1, figs. 1–3, 4a–b, 5a–b, 6–8a, pl. 2, figs. 4c, 5c, 8b–9.

Holotype: Geological Institute, "Bergakademie" of Freiberg, German Democratic Republic, specimen unnumbered; an adult LV.

Type locality: Bohlen, Kahlleite Quarry, German Democratic Republic; shales with limestone nodules, do IIß, *Cheiloceras* stage, Upper Devonian. Cephalopod facies, ostracod faunas of Thuringian and entomozoan ecotypes.

Explanation of Plate 15, 30

Fig. 1, ♀ RV, ext. lat. (SMF Xe 13950, 825 µm long); fig. 2, juv. LV, ext. lat. (SMF Xe 13948, 700 µm long); fig. 3, ♂ RV, ext. lat. (SMF Xe 13951, 780 µm long).

Scale A (300 µm; × 90), figs. 1, 3; scale B (300 µm; × 65), fig. 2.

Figured specimens: "Forschungs-Institut Senckenberg" (SMF), Federal Republic of Germany, nos. SMF Xe 13948 (juv. LV: Pl. 15, 30, fig. 2; Pl. 15, 32, fig. 2), SMF Xe 13950, (♀ RV: Pl. 15, 30, fig. 1; Pl. 15, 30, fig. 1), SMF Xe 13951 (♂ RV: Pl. 15, 30, fig. 3; Pl. 15, 32, fig. 3). Collected by W. Ziegler.

All of the figured specimens are from a locality at the path-bifurcation, about 1 km NW of Allendorf village, 9 km NE Plettenberg (lat. 51° 13'N, long. 7° 53'E), Sauerland, Federal Republic of Germany; *Wocklumeria* stage, Upper Devonian; basinal sediments.

Diagnosis: *Tricornina (Bohemina)* species with strong lateral spine, subcentrally situated, without noticeably broadened base. Lateral surface smooth to more or less closely spinose. Sexual dimorphism: ornamental extradomicial. Adult tecomorphs with single adventral ridge or row of denticles; juveniles with additional ornamented adventral field. Heteromorphs with two smooth or dentate adventral ridges.

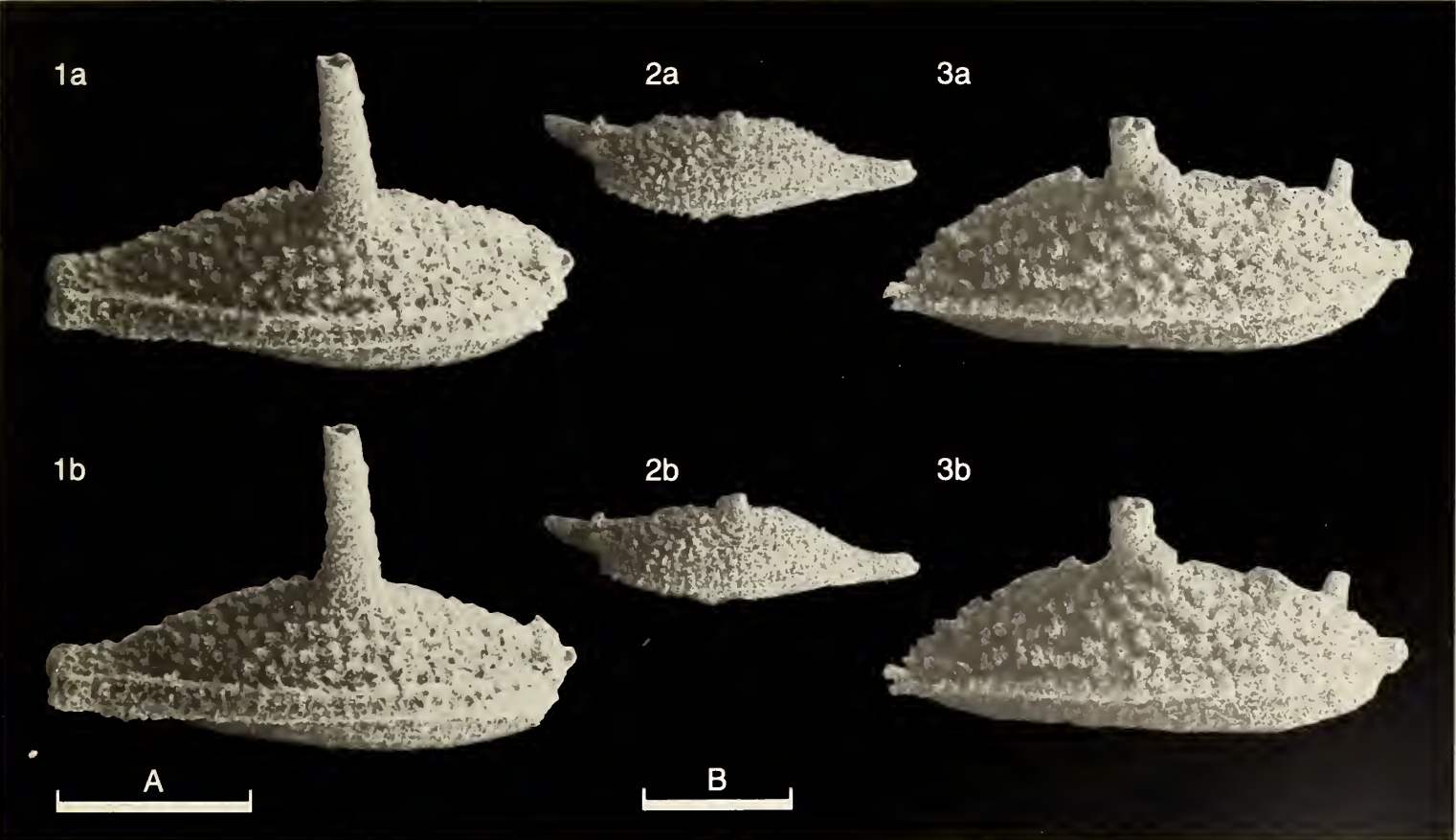
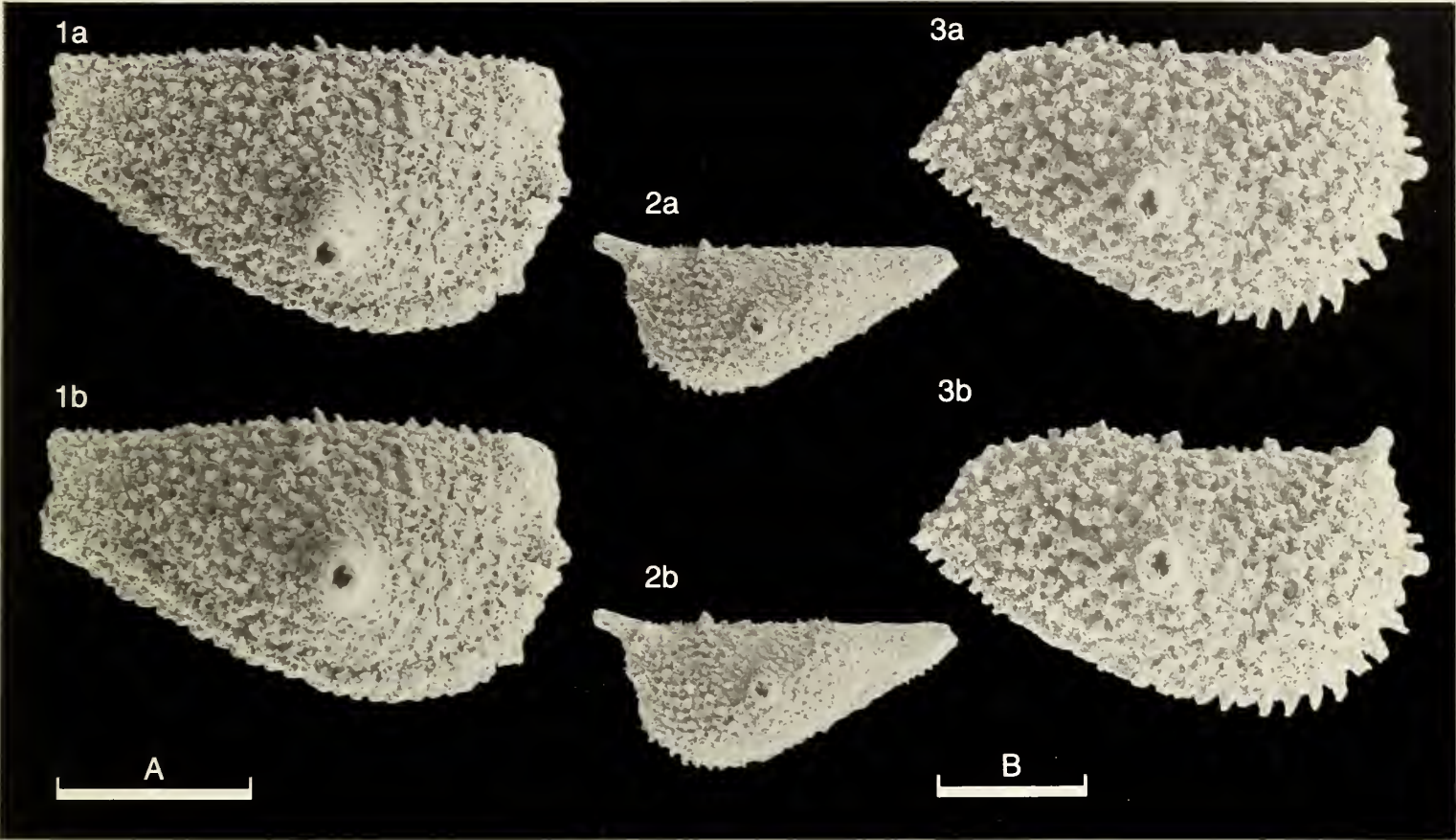
Remarks: Blumenstengel (1965, *op. cit*) describes the specimens from E Thuringia as having 1–2, partly dentate adventral ridges. The Rhenish material herein indicates that this "variability" may be due to sexual dimorphism. In tecomorphic valves from the Sauerland area, adventral denticles are developed, becoming smaller towards the dorsal parts of the valve. The subventral field (of the juveniles only?) shows delicately dentate ripples (cf. also the greater magnifications in Becker 1988, pl. 1, figs. 6d and 8a). *T. paragracilis* is believed to be a nectobenthic species.

Distribution: E Thuringian and Rechtsrheinisches Schiefergebirge, Germany; SE Cantabrian Mountains, N Spain; ? W Serbia. Upper Devonian (do I–VI). Basinal facies.

Explanation of Plate 15, 32

Fig. 1, ♀ RV, vent. obl. (SMF Xe 13950); fig. 2, juv. LV, vent. obl. (SMF Xe 13948); fig. 3, ♂ RV, vent. obl. (SMF Xe 13951).

Scale A (300 µm; × 90), figs. 1, 3; scale B (300 µm; × 65), fig. 2.



ON *BRADLEYA NORMANI* (BRADY)

by David W. Foster & Roger L. Kaesler
(University of Kansas, Lawrence, Kansas, USA)

Bradleya normani (Brady, 1865)

- 1865 *Cythere normani* sp. nov. G. S. Brady, *Trans. zool. Soc. Lond.*, **5**, 379–380, pl. 61, figs. 5a–d.
1880 *Cythere normani* Brady; G. S. Brady, *Rep. scient. Results Voy. Challenger, Zoology*, **1**, 101–102 (*pars*), pl. 17, figs. 3a–d only (*non* pl. 26, figs. 4a, b).
1972 *Bradleya normani* (Brady); R. H. Benson, *Smithsonian Contributions to Paleobiology*, no. 12, 38–39, fig. 13C, pl. 2, fig. 7, pl. 7, fig. 8.

Lectotype: Designated herein. Hancock Museum, Newcastle-upon-Tyne, England, no. **1.32.32**; ♀ right valve, 780 µm long.

[Paralectotype: middle specimen of three on slide no. **2.06.32**].

Type locality: Abrolhos Bank off Brazil (approx. lat. 17° 30'S, long. 39° 00'W), depth unknown; Recent, marine.

Figured specimens: Hancock Museum, Newcastle-upon-Tyne, England, no. **1.32.32** (lectotype, ♀ RV: Text-fig. 1d). Museum of Invertebrate Paleontology, University of Kansas, USA, nos. **1,122,943** (♀ LV, morph 1: Pl. 15, 34, fig. 1; Pl. 15, 36, fig. 3; Text-fig. 1a), **1,122,948** (♀ LV, morph 2: Pl. 15, 34, fig. 2; Text-fig. 1b), **1,122,945** (♀ LV, morph 3: Pl. 15, 34, fig. 3; Text-fig. 1c), **1,122,933** (♂ RV: Pl. 15, 36, fig. 1), **1,122,939** (♀ RV: Pl. 15, 36, fig. 2), **1,122,934** (♀ LV: Pl. 15, 36, fig. 4).

All except lectotype are from Recent sediment, lat. 52° 50' – 51'S, long. 73° 55'W, depth 526.7 m, Strait of Magellan, off southern Chile (SE Pacific) from dredge samples collected in 1969 by the junior author aboard N.S.F. RV *Hero*, cruise 69–5.

Diagnosis: Carapace large, with coarse primary reticulation; some simplification of reticular pattern by reduction of muri and partial fusion of fossae. Muri characteristically foveolate. Subcentral

Explanation of Plate 15, 34

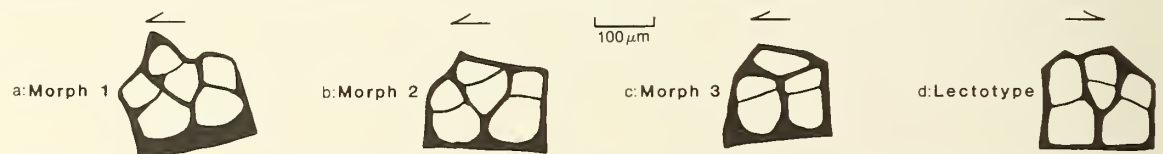
Fig. 1, ♀ LV, morph 1, ext. lat. (**1,122,943**, 927 µm long); fig. 2, ♀ LV, morph 2, ext. lat. (**1,122,948**, 905 µm long); fig. 3, ♀ LV, morph 3, ext. lat. (**1,122,945**, 909 µm long). Scale A (500 µm; × 58), figs. 1–3.

Stereo-Atlas of Ostracod Shells 15, 35

Bradleya normani (3 of 4)

Diagnosis (cont.): tubercle strongly developed. Ocular ridge weak, posterior median ridge replaced by sublinear box-like arrangement of fossae. Ventrolateral carina with terminal spine, more strongly developed than dorsal carina. Marginal spines concentrated on anteroventral and posteroventral margins. Blind. Appendages unknown.

Remarks: This species is morphologically quite variable. We have identified three morphs, each with a different posteroventral reticular pattern, which are characterized by the specimens illustrated in Pl. 15, 34, figs. 1–3 and detailed in Text-fig. 1. Fossae of morph 1 are subrounded and separated by thick to moderately thick muri. Muri of morph 2 are greatly reduced between three pairs of fossae resulting in partial fusion of the fossae. Morph 3 is characterized by weak muri between two pairs of fossae and a fully fused, much smaller fossa capping the two. The lectotype belongs to morph 2; fossae of the paralectotype are infilled with a matrix that obscures the reduced murae. Males are rare, comprising less than five percent of our collections.



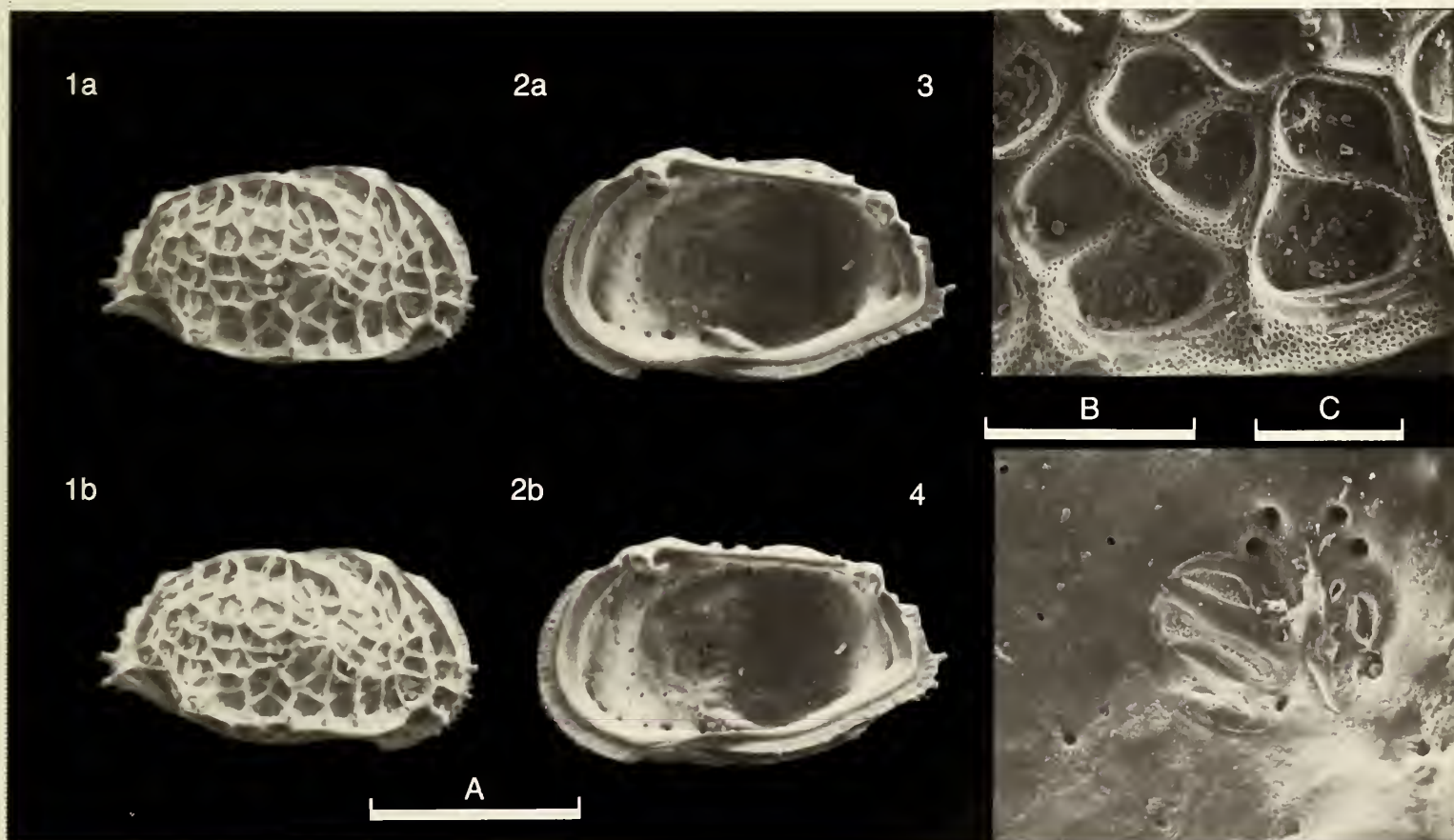
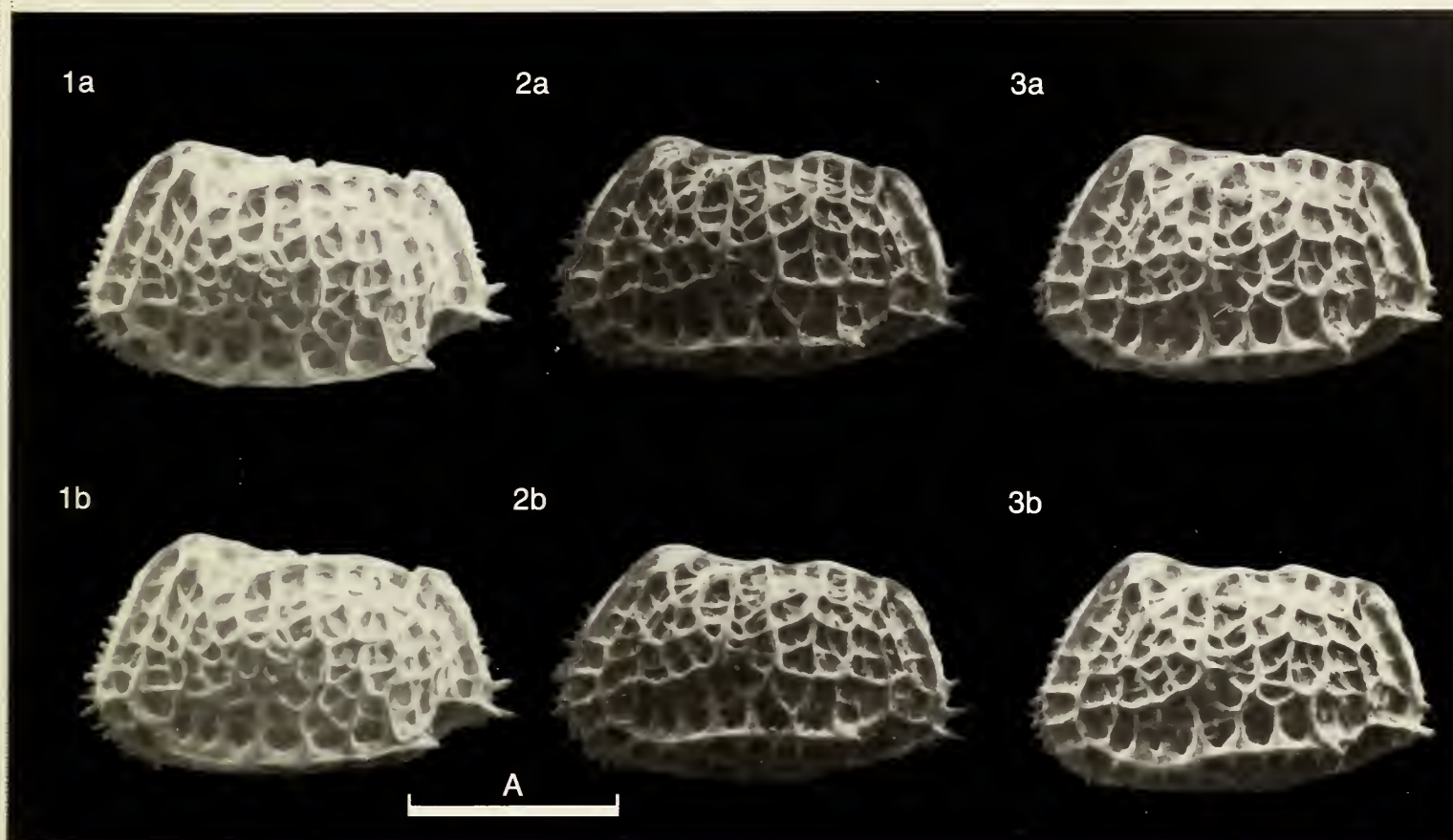
Text-fig. 1. Camera-lucida drawing of posteroventral reticular pattern of three morphs and the lectotype of *Bradleya normani*.

Distribution: Atlantic Ocean, eastern Pacific Ocean, southern oceans; typically found in upper bathyal depths but shallower at high latitudes.

Acknowledgements: We are grateful to R. H. Benson, K. G. McKenzie, J. E. Whittaker, D. J. Horne, and P. S. Davis for their help with various aspects of the research. Our work was partially supported by National Science Foundation grants GA-12472 and GV-25157 and by The University of Kansas General Research Fund, grant 3656-20-0038.

Explanation of Plate 15, 36

Fig. 1, ♂ RV, morph 1, ext. lat. (**1,122,933**, 873 µm long); fig. 2, ♀ RV, int. lat. (**1,122,939**, 909 µm long); fig. 3, ♀ LV, ext. lat., detail of posteroventral reticular pattern, morph 1 (**1,122,943**); fig. 4, ♀ LV, int. lat., detail of muscle-scar pattern (**1,122,934**). Scale A (500 µm; × 58), figs. 1, 2; scale B (100 µm; × 290), fig. 3; scale C (100 µm; × 225), fig. 4.



ON *RETICULOCOSTA ORNATORETICULATA* (REYMENT)

by Richard Reyment

(Department of Historical Geology & Palaeontology, University of Uppsala, Sweden)

Genus *RETICULOCOSTA* Gründel, 1974

Type-species (by original designation): *Veenia (Veenia) ornato-reticulata* Reyment, 1963.

Diagnosis: Lateral outline of carapace rectanguloid, with rounded anterior margin and bluntly pointed posterior. Left valves have a weak hinge-ear. Lateral surface irregularly reticulate; there is an anterior ridge, anterior of which are coarse reticulations, and a corresponding posterior ridge. There are three lateral ribs, the ventral of which is flat; the ventral and median ribs are arched and unite anteriorly. The indistinct adductor muscle tubercle is located on the median rib. Eye-tubercles prominent, with broad internal sockets (the location of which is visible on the valve-surface as a truncated riblet); the eye-tubercle is joined to the anterior ridge. Dorsal surface of each valve with two rows of coarse reticulations; ventral surface of each with two rows of ovoid reticulations. The anterior and posterior denticulations are stronger in the ventral halves of the margins. Left hinge comprises an anterior socket, pointed postjacent tooth, a smooth median bar, and a partly breached posterior socket. There is an overlapping extension of the left valve immediately in front of the anterior hinge-element. Right hinge with an anterior tooth, a postjacent re-entrant socket, a smooth median furrow, and a stepped and angled posterior tooth. Line of concrescence and inner margin not exactly coincident. Marginal pore-canals numerous and

Explanation of Plate 15, 38

Fig. 1, ♀ car., rt. lat. (PMAf 127, 675 µm long); fig. 2, ♂ car., dors. (PMAf 130, 810 µm long); fig. 3, ♀ car., lt. lat. (PMAf 126, 655 µm long); fig. 4, ♀? car., vent. (PMAf 131, 730 µm long).

Scale A (100 µm; × 90), figs 1, 3; scale B (100 µm; × 75), fig 2; scale C (100 µm; × 100), fig. 4.

Diagnosis (cont.): simple. Central muscle field with four scars in a vertical row and an anterior v-shaped scar. Sexual dimorphism strong: males longer and lower than females. Late juvenile instars regularly reticulated and indistinctly ribbed.

Remarks: *Reticulocosta* resembles *Repandocosta* Hazel, 1967 in many respects, such as shape and mode of reticulation, but differs in details of the curved ribbing and in having a less prominent adductor muscle tubercle and smooth hinge elements. *Mosaeleberis* Deroo, 1966, is also quite similar but lacks an anterior ridge.

Distribution: Early Paleocene of Nigeria and the Maastrichtian of Ghana. Possibly also occurs in the Santonian of South Africa.

Reticulocosta ornato-reticulata (Reyment, 1963)

1963 *Veenia (Veenia) ornato-reticulata* sp. nov., R. A. Reyment, *Stockh. Contr. Geol.*, 10, 188, pl. 2, fig. 6, pl. 6, figs. 1a–c, pl. 16, fig. 7, Text-fig. 49.

1974 *Reticulocosta ornato-reticulata* (Reyment); J. Gründel, *Freiberger ForschHft.*, C 298, 88, fig. 5.

1981 *Mosaeleberis ornato-reticulata* (Reyment); R. A. Reyment, *Bull. geol. Instn Univ. Uppsala*, NS 9, 63, pl. 8, fig. 12, pl. 9, fig. 8.

Holotype: Geological Department, University of Stockholm, no. G10 1132; a carapace.

Type locality: Subsurface of western Nigeria, Araromi borehole (approx. lat. 06° 35' N, long. 04° 55' E) at a depth of 1454 ft; in the Araromi Shale, early Paleocene.

Figured specimens: Palaeontological Museum, University of Uppsala, Sweden, nos. PMAf126 (♀ car.: Pl. 15, 38, fig. 3), PMAf127 (♀ car.: Pl. 15, 38, fig. 1), PMAf128 (♂ RV: Pl. 15, 40, figs. 1, 3, 4), PMAf129 (♀ LV: Pl. 15, 40, figs. 2, 5, 6), PMAf130 (♂ car.: Pl. 15, 38, fig. 2), PMAf131 (♀ car.: Pl. 15, 38, fig. 4). All from the type locality and horizon.

Diagnosis: A variably reticulate form showing variation in the strength of the adductor muscle tubercle.

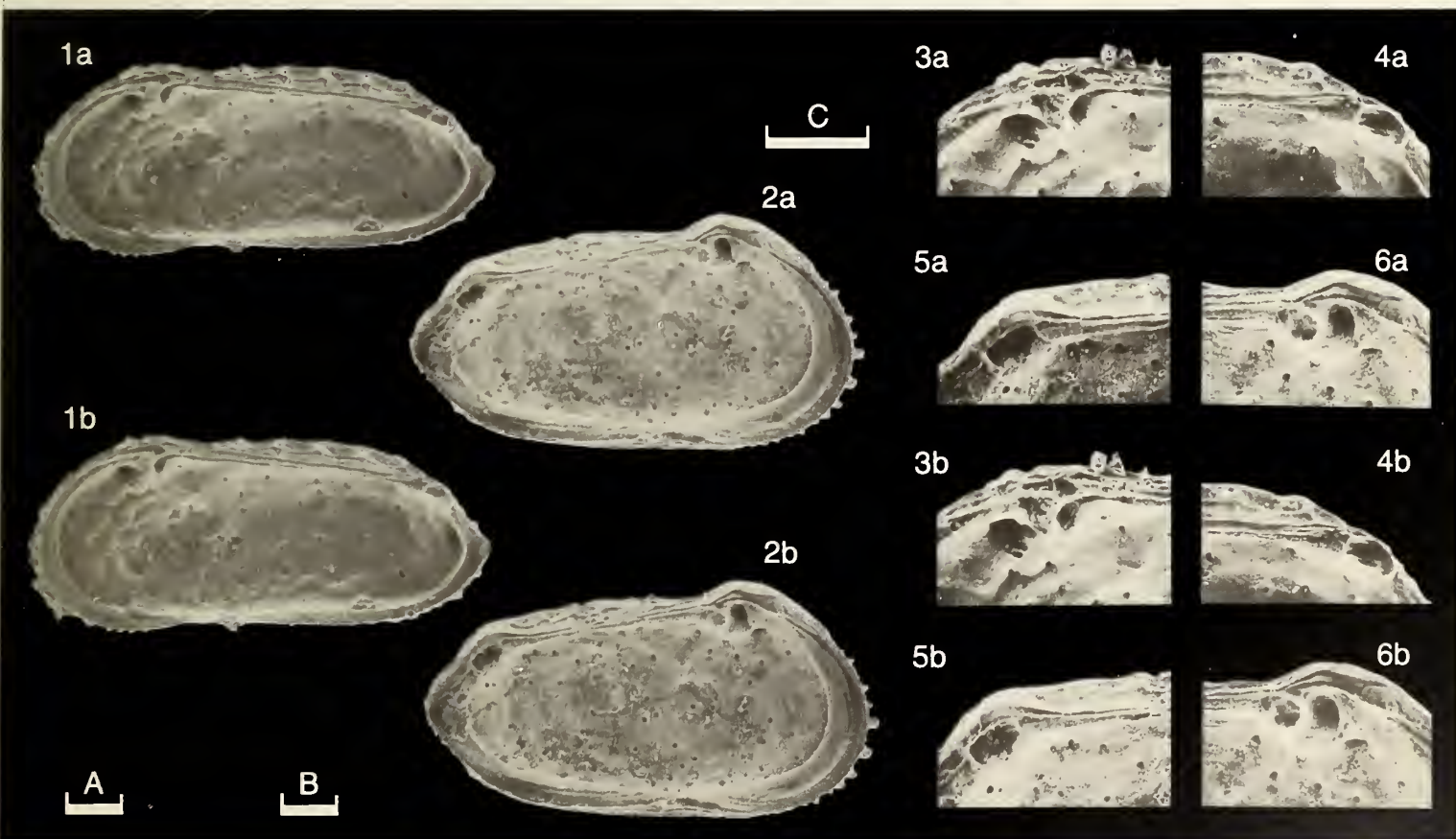
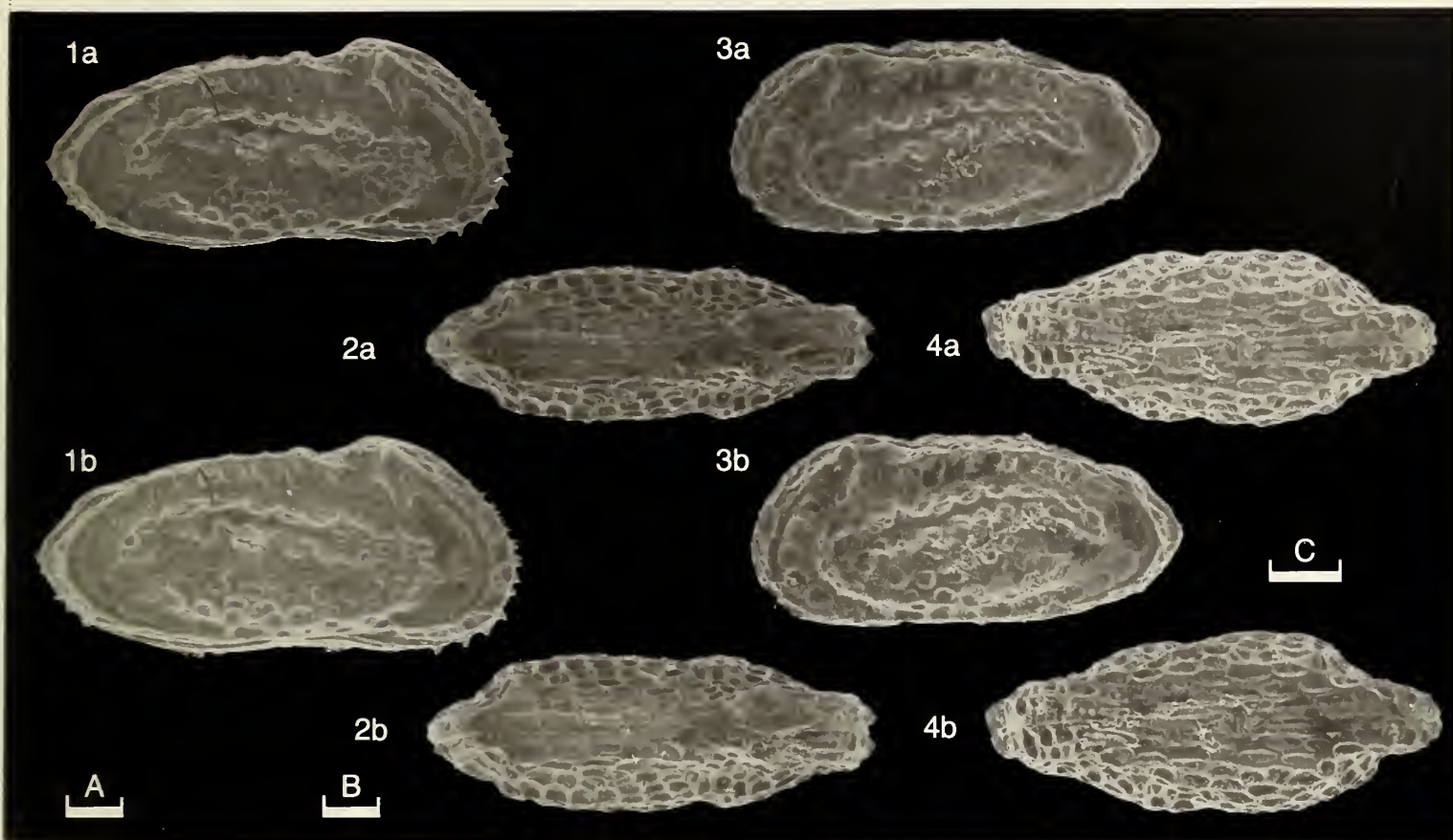
Remarks: The proportion of males to females in this species does not have the normal Mendelian sex-ratio, there being 24.5 – 37.4% of males in the samples available for study.

Distribution: Maastrichtian to early Paleocene of West Africa.

Explanation of Plate 15, 40

Fig. 1, 3, 4, ♂ RV (PMAf128, 835 µm long): fig. 1, int. lat.; figs. 3, 4, details of anterior and posterior hinge elements. Figs. 2, 5, 6, ♀ LV (PMAf129, 680 µm long): fig. 2, int. lat.; figs. 5, 6, details of posterior and anterior hinge elements.

Scale A (100 µm; × 75), fig. 1; scale B (100 µm; × 90), fig. 2; scale C (100 µm; × 150), figs. 3–6.



ON *QUADRACYTHERE KEENI* SLIPPER sp. nov.

by Ian J. Slipper
(City of London Polytechnic, England)

Quadracythere keeni sp. nov.

1977 *Quadracythere diversinodosa* (Lienenklaus); M. C. Keen, in: F. M. Swain (ed.), *Stratigraphic Micropaleontology of Atlantic Basin and Borderlands, Develop. Palaeont. Stratigr., Amsterdam*, 6, 488, pl. 2, fig. 6.

1978 *Quadracythere nodosa* Haskins; M. C. Keen, in: R. H. Bate & E. Robinson (eds), *A. Stratigraphical Index of British Ostracoda, Geol. J. Spec. Issue*, 8, 420, pl. 11, fig. 17; non pl. 11, figs. 14, 16.

Holotype: British Museum (Nat. Hist.) no. **OS 13044**; ♀ carapace.

[Paratypes: British Museum (Nat. Hist.) nos. **OS 13045 – 13047**].

Type locality: Northern end of Whitecliff Bay, Isle of Wight, Hampshire, England (lat. 50° 40' N, long. 1° 05' W); Oyster bed, base of the Bembridge Marls Member, Bouldnor Formation, Solent Group, Oligocene.

Derivation of name: After Dr. M. C. Keen, in recognition of his studies of Tertiary ostracods.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 13045** (paratype, ♂ car.: Pl. 15, 42, figs. 1, 2), **OS 13044** (holotype, ♀ car.: Pl. 15, 42, figs. 3, 4), **OS 13047** (paratype, ♀ RV: Pl. 15, 44, figs. 1–3), **OS 13046** (paratype, ♀ car.: Pl. 15, 44, fig. 4).

All collected by the author from the type horizon and locality.

Diagnosis: Species of *Quadracythere* with ornament of irregular fossae and tuberculate muri surrounding the main antero-central tubercle where the carapace attains greatest inflation. Ventral margin strongly sinuous in left valve, weakly so in right valve. Very prominent, curved ventrolateral carina partly overhanging ventral margin, curving strongly upwards posteriorly. Dorsolateral muri coalesce posterodorsally in an angular projection. Posterior hinge tooth in right valve robust with obscure lobation.

Explanation of Plate 15, 42

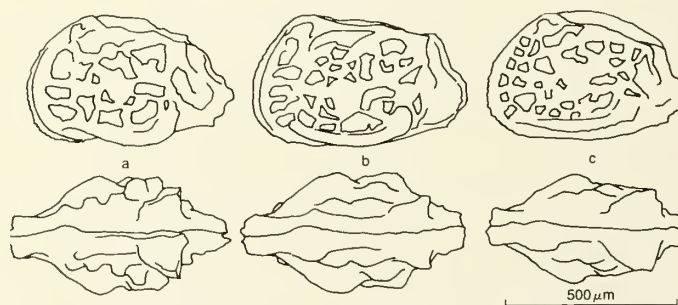
Figs. 1, 2, ♂ car. (paratype, **OS 13045**, 580 µm long); fig. 1, lt. lat.; fig. 2, car. dors., figs. 3, 4, ♀ car. (holotype, **OS 13044**, 600 µm long); fig. 3, lt. lat.; fig. 4, car. dors. Scale A (100 µm; × 100), figs. 1–4.

Stereo-Atlas of Ostracod Shells 15, 43

Quadracythere keeni (3 of 4)

Remarks: This species, from the basal Oligocene, Isle of Wight, was initially referred to *Q. diversinodosa* (Lienenklaus, 1894) (*Z. dt. geol. Ges.*, 46, 212–213, pl. 15, fig. 1a–d) by Keen (1977 *op. cit.*) who used it to define zone 13a (early Oligocene) in his zonation of the NW European Tertiary. In a revised zonation, Keen (1978, *op. cit.*) excluded zone 13a, referring his specimens instead to the Eocene species *Q. nodosa* Haskins, 1971 (*Revue Micropaléont.*, 14, 155, pl. 2, figs. 21–28). Comparison of the present material with type specimens of *Q. nodosa* and *Q. diversinodosa* (see D. J. Horne & I. J. Slipper, *Stereo-Atlas Ostracod Shells*, 15, 45–48, 1988) has shown that the three are distinct (see Text-fig. 1 for comparative outlines). Keen's Oligocene form is accordingly described herein as a new species, *Q. keeni*; it is most easily recognised by the strongly curved ventrolateral carina, which overhangs the ventral margin. It follows that Keen's original zone 13a may be considered valid (early Oligocene, represented by the Bembridge Marls in southern England).

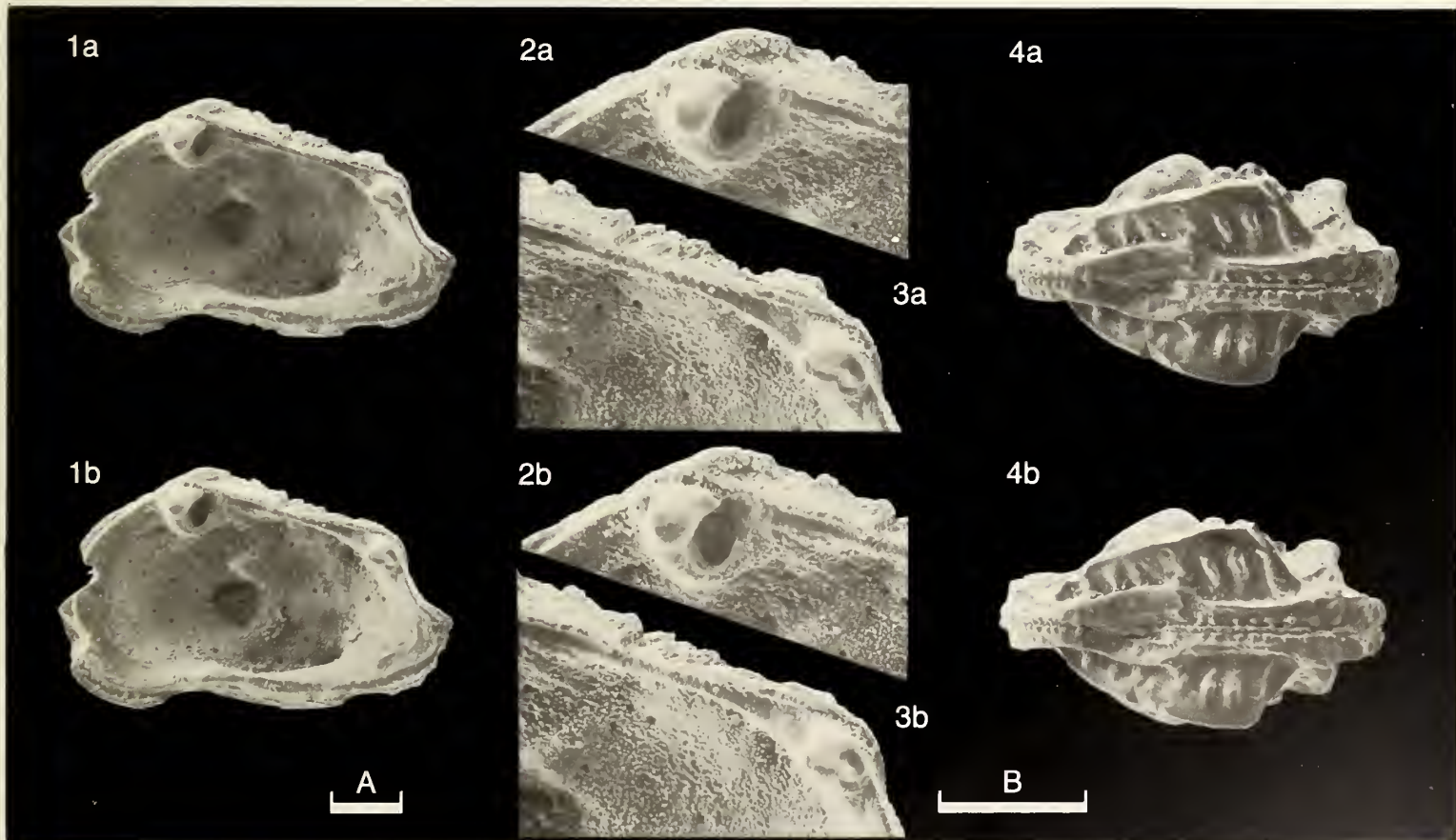
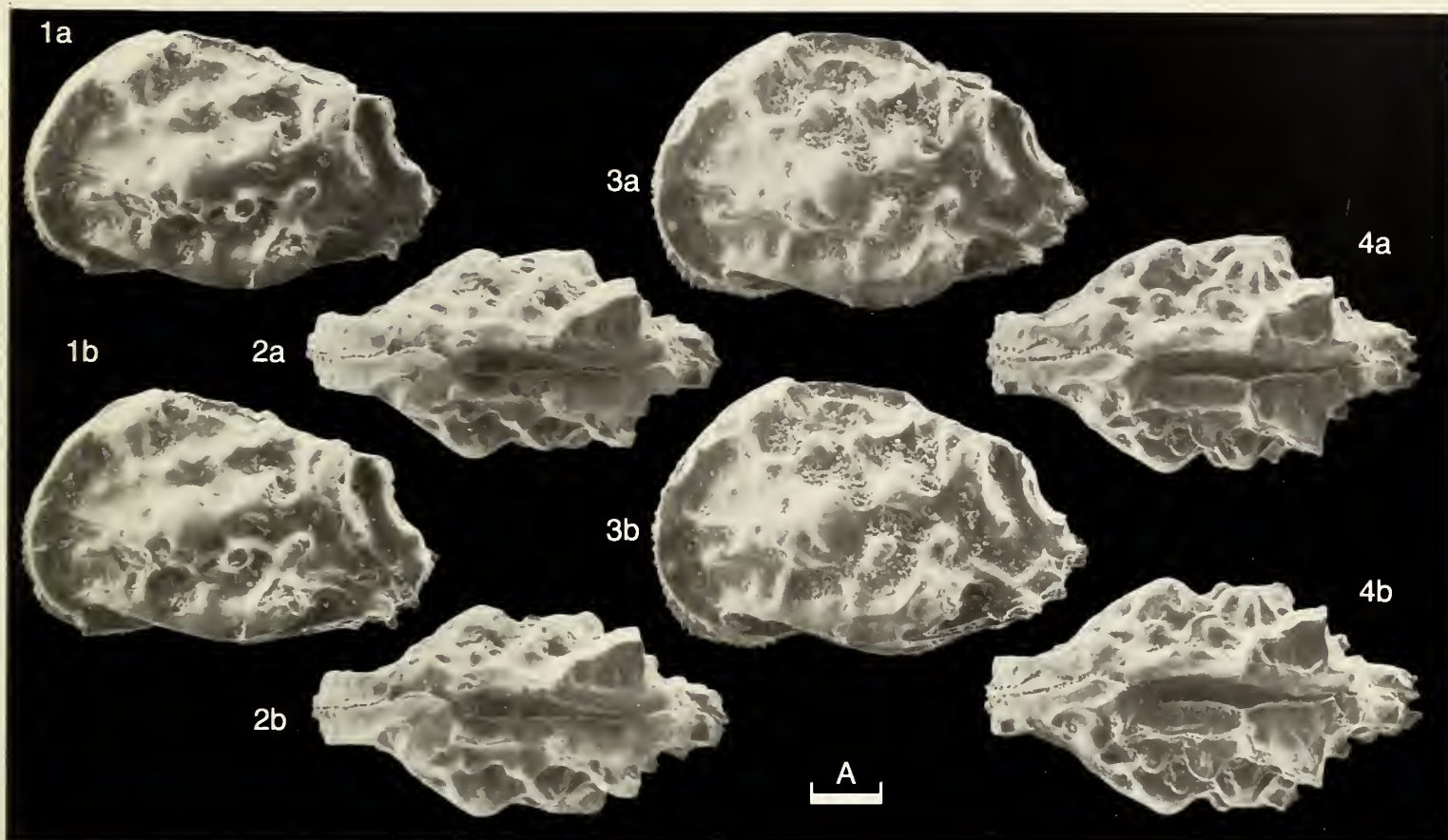
Distribution: Early Oligocene (Keen 1978, *op. cit.*); possibly restricted to the Bembridge Marls Member of the Hampshire Basin, southern England.



Text-fig. 1. Comparative outlines of carapaces (lt. lat. and dors. views) of: a, *Q. keeni*; b, *Q. diversinodosa*; c, *Q. nodosa*. All drawn from type material.

Explanation of Plate 15, 44

Figs. 1–3, ♀ RV (paratype, **OS 13047**, 550 µm long): fig. 1, int. lat.; fig. 2, ant. hinge element; fig. 3, post. hinge element; fig. 4, ♀ car. vent. (paratype, **OS 13046**, 540 µm long). Scale A (100 µm; × 100), figs. 1, 4; scale B (100 µm; × 200), figs. 2, 3.



ON *QUADRACYTHERE NODOSA* HASKINS

by David J. Horne & Ian J. Slipper
(City of London Polytechnic, England)

Quadracythere nodosa Haskins, 1971

- 1971 *Quadracythere nodosa* sp. nov. C. Haskins, *Revue Micropaléont.*, **14**, 155, pl. 2, figs. 21–28.
1978 *Quadracythere nodosa* Haskins; M. C. Keen, in: R. H. Bate & E. Robinson (eds.), *A Stratigraphical Index of British Ostracoda*, *Geol. J. Spec. Issue*, **8**, 420, pl. 11, figs. 14, 16; non pl. 11, fig. 17.

Holotype: University of Hull, no. **HU.14.T.6.2288**; a left valve.

[Paratypes: University of Hull, nos. **HU.14.T.6.2289–2296**; one complete carapace, seven detached valves].

Type locality: Alum Bay, Isle of Wight, Hampshire, England, approx. lat. 50°40' N, long. 01°34' W; Barton Clay Formation, Barton Group, late Eocene.

Figured specimens: University of Hull, nos. **HU.14.T.6.2288** (holotype, LV: Pl. 15, 46, fig. 1), **HU.14.T.6.2302** (paratype, LV: Pl. 15, 46, fig. 2), **HU.14.T.6.2298** (paratype, RV: Pl. 15, 46, fig. 3, Pl. 15, 48, fig. 1), **HU.14.T.6.2289** (paratype, car.: Pl. 15, 48, figs. 2, 3). All from the type locality and horizon.

Explanation of Plate 15, 46

Fig. 1, LV, ext. lat. (holotype, **HU.14.T.6.2288**, 500 µm long); fig. 2, LV, int. lat. (paratype, **HU.14.T.6.2302**, 520 µm long); fig. 3, RV, int. lat. (paratype, **HU.14.T.6.2298**, 530 µm long).
Scale A (100 µm; ×110), figs. 1–3.

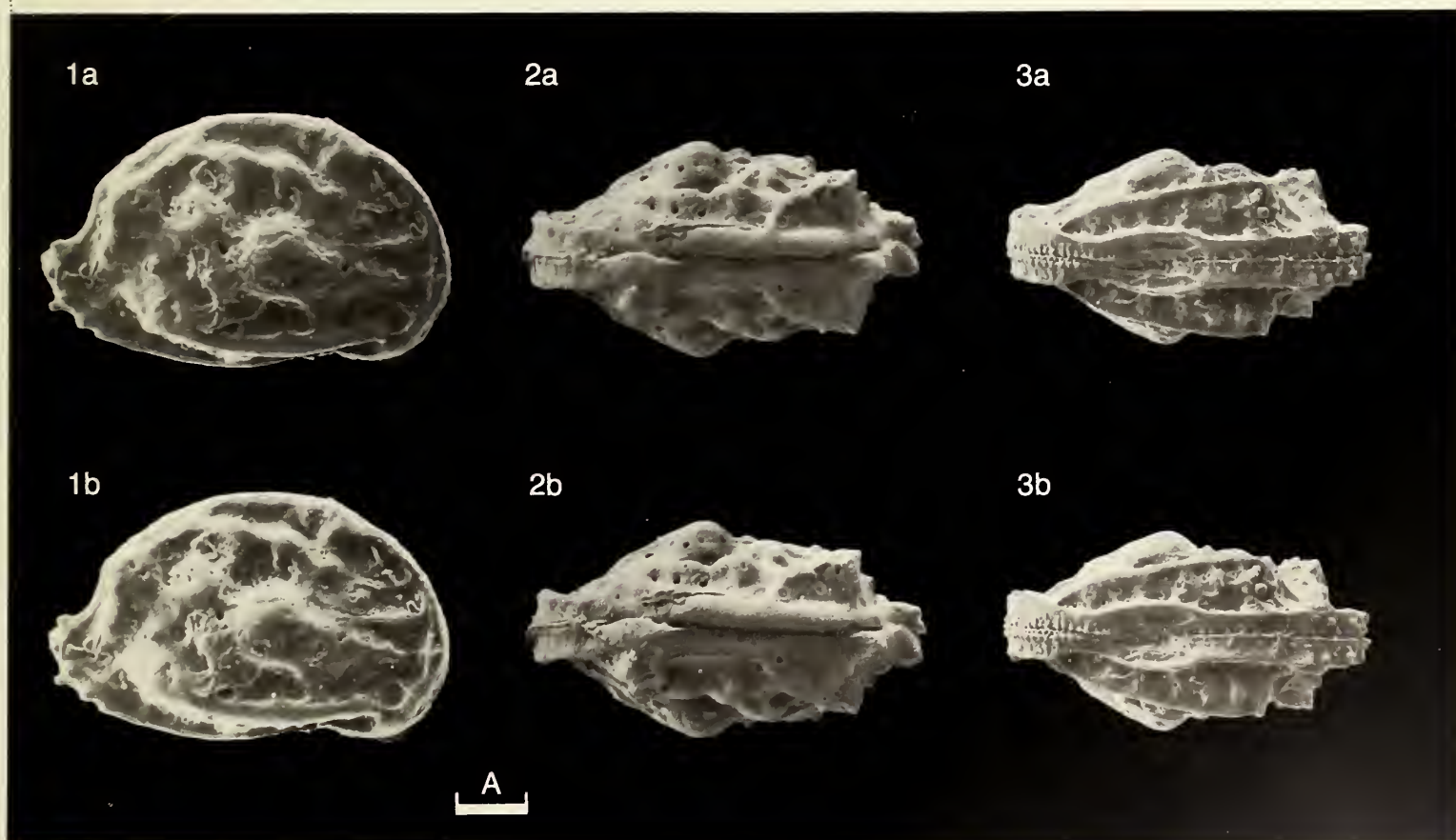
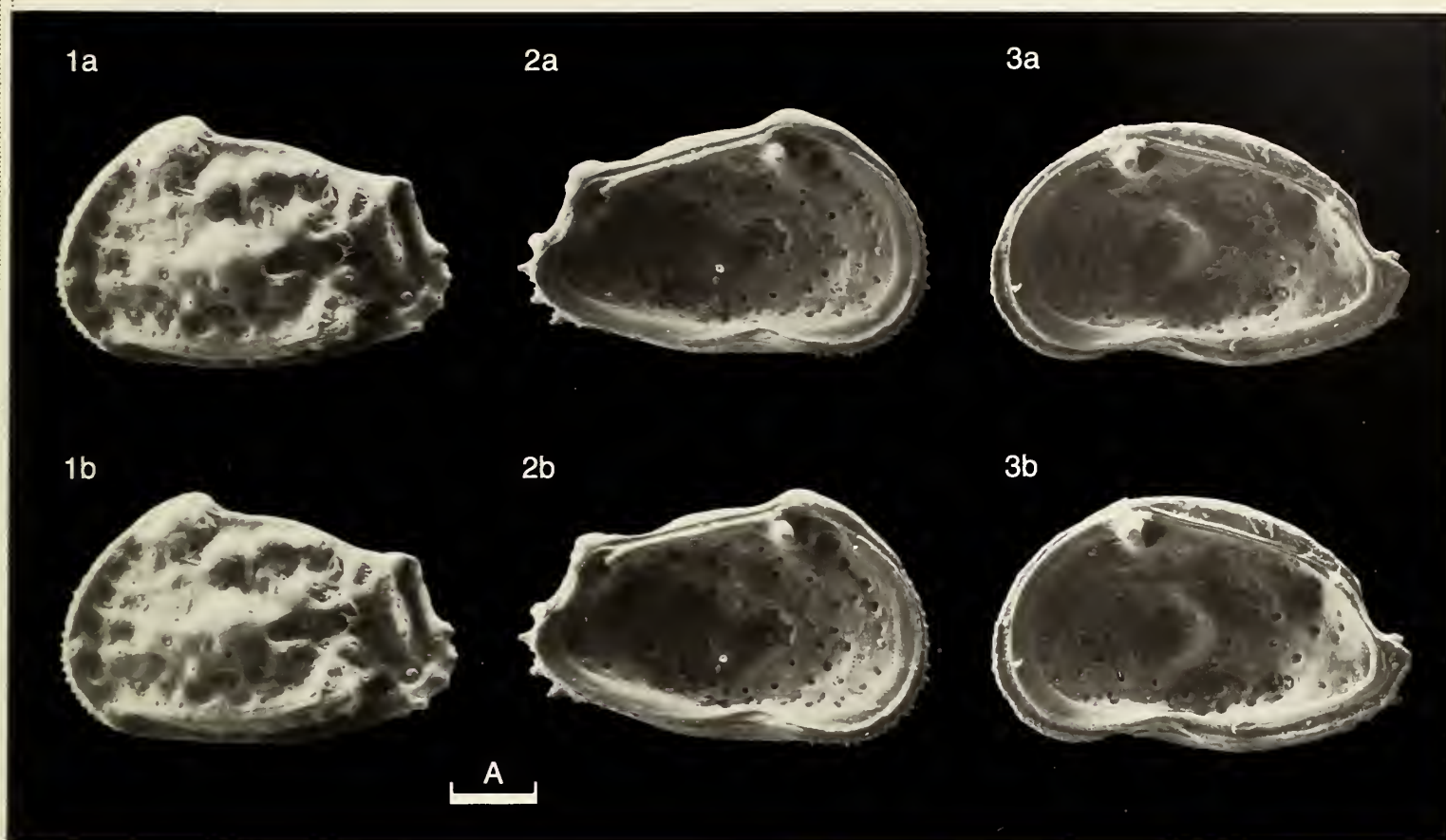
Diagnosis: Species of *Quadracythere* with ornament of tuberculate muri forming coarse reticulation surrounding the main antero-central tubercle where the carapace attains greatest inflation. Ventral margin weakly convex in left valve, sinuous in right valve. Dorsal margin of left valve with slight arch between prominent anterior and posterior cardinal angles, evenly curved in right valve. Anterior marginal area with distinct fossae. Ventrolateral carina weakly curved upwards posteriorly. Raised dorsolateral muri coalesce posterodorsally in a projection. Weak posterior hinge tooth in right valve with obscure lobation.

Remarks: *Q. nodosa* is similar to *Q. diversinodosa* (Lienenklaus, 1894 (*Z. dt. geol. Ges.*, **46**, 212–213, pl. 15, fig. 1a–d). Type material of the latter was kindly loaned to us by Dr S. Ritzkowski (Institut und Museum für Geologie und Paläontologie, Göttingen). The holotype (illustrated by B. Moos, *Geol. Jb.*, **82**, pl. 1, fig. 10, 1963), is poorly preserved, but comparison with topotypes shows significant differences: *Q. diversinodosa* has a straighter dorsal margin, less regular anterior marginal fossae, and is larger (670 µm long). *Q. nodosa sensu* Keen (*op. cit.* pl. 11, fig. 17) is now assigned to *Q. keeni* Slipper, 1988 (*Stereo-Atlas Ostracod Shells*, **15**, 41–44).

Distribution: Late Eocene, Hampshire Basin, southern England.

Explanation of Plate 15, 48

Fig. 1, RV, ext. lat. (paratype, **HU.14.T.6.2298**, 530 µm long); figs. 2, 3, car. (paratype, **HU.14.T.6.2289**, 500 µm long): fig. 2, car. dors.; fig. 3, car. vent.
Scale A (100 µm; ×110), figs. 1–3.



ON *TIMIRIASEVIA UPTONI* TIMBERLAKE sp. nov.

by Simon Timberlake
(Sedgwick Museum, University of Cambridge)

Timiriasevia uptoni sp. nov.

1976 *Timiriasevia* sp. I. W. M. Rohr, *Inaug. Diss. Free Univ. Berlin*, 66–67, pl. 10.

Holotype: British Museum (Nat. Hist.) no. OS 12992; ♀ LV.

[Paratypes: nos. OS 12993–OS 13000, OS 13081–OS 13084].

Type locality: SE section of old clay pit near the 'Round House', Tarlton, Cirencester, Gloucestershire, England (Nat. Grid Ref. SO 970000); non-marine band in Forest Marble Clay. Pale grey marly clay, 25–53 cm below base of the Lower Cornbrash Limestone, Bathonian, middle Jurassic.

Derivation of name: In honour of Charles Upton who described fossil Characea and first recorded the presence of marine, estuarine and 'fresh-water' ostracod genera from this locality (*Proc. Cotteswold Nat. Fld Club*, 16 (3), 237–239, 1909).

Figured specimens: British Museum (Nat. Hist.) nos. OS 12992 (holotype, ♀ LV : Pl. 15, 50, fig. 1), OS 12993 (paratype, ♀ RV : Pl. 15, 50, fig. 2), OS 12994 (paratype, ♂ LV : Pl. 15, 52, fig. 1), OS 12995 (paratype, ♂ RV : Pl. 15, 52, fig. 2), OS 12996 (paratype, ♀ car. : Pl. 15, 54, fig. 1), OS 12997 (paratype, ♀ car. : Pl. 15, 54, fig. 2), OS 12998 (paratype, ♂ car. : Pl. 15, 54, fig. 3), OS 12999 (paratype, ♂ car. : Pl. 15, 56, fig. 7), OS 13000 (paratype, ♀ LV : Pl. 15, 56, fig. 1), OS 13081 (paratype, ♀ RV : Pl. 15, 56, fig. 2), OS 13082 (paratype, ♂ LV : Pl. 15, 56, fig. 3), OS 13083 (paratype, ♂ RV : Pl. 15, 56, figs. 4, 5), OS 13084 (paratype, A-2 juv. RV : Pl. 15, 56, fig. 6).

The paratypes are from the same sample (T6A) as the holotype or from sample T5B1; both pale grey marly clay, respectively 31–38 and 46–53 cm below the base of the Lower Cornbrash Limestone at the type locality.

Explanation of Plate 15, 50

Fig. 1, ♀ LV, ext. lat. (holotype, OS 12992, 615µm long); fig. 2, ♀ RV, ext. lat. (paratype, OS 12993, 655µm long).
Scale A (100µm; x 140), figs. 1, 2.

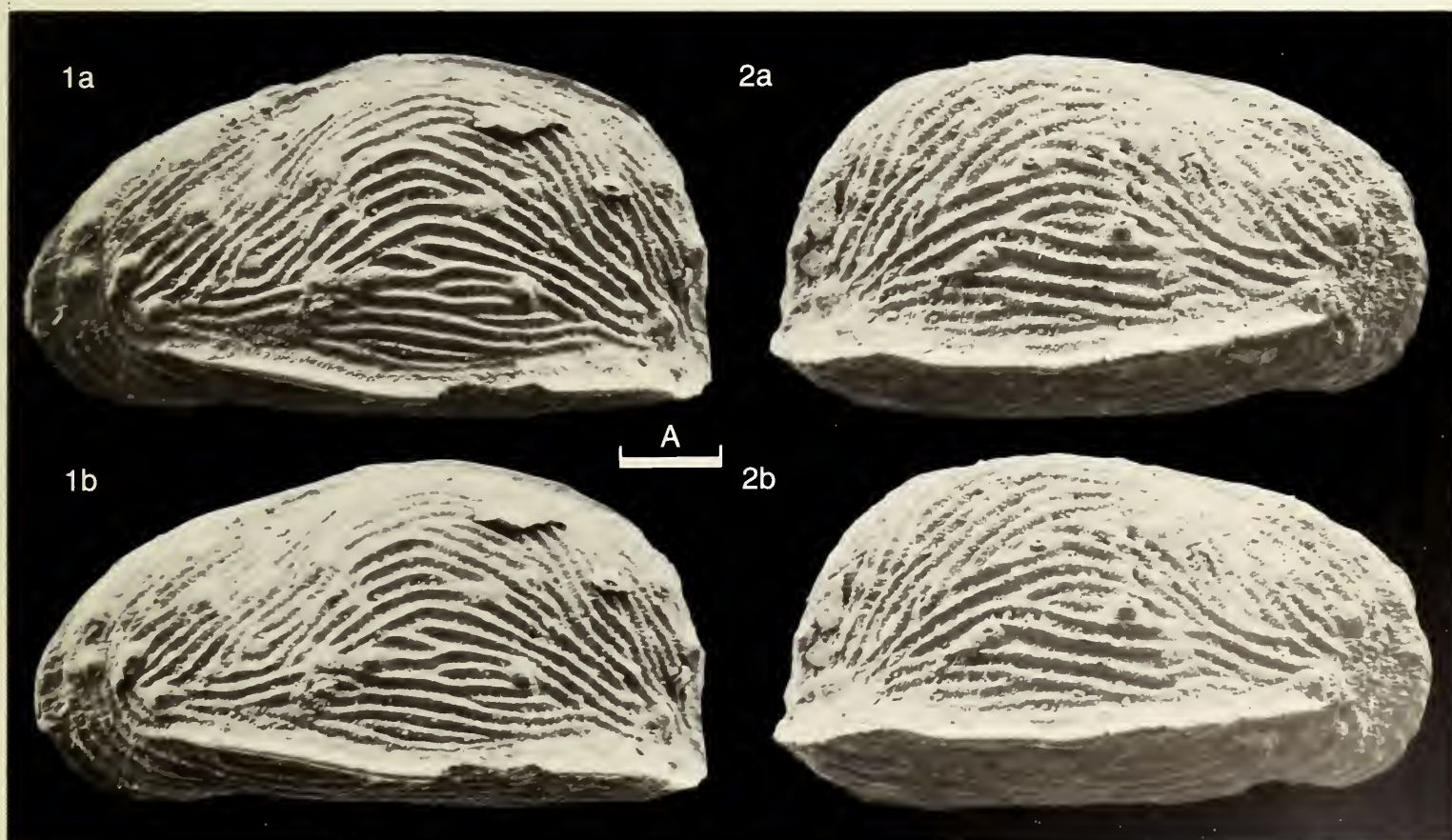
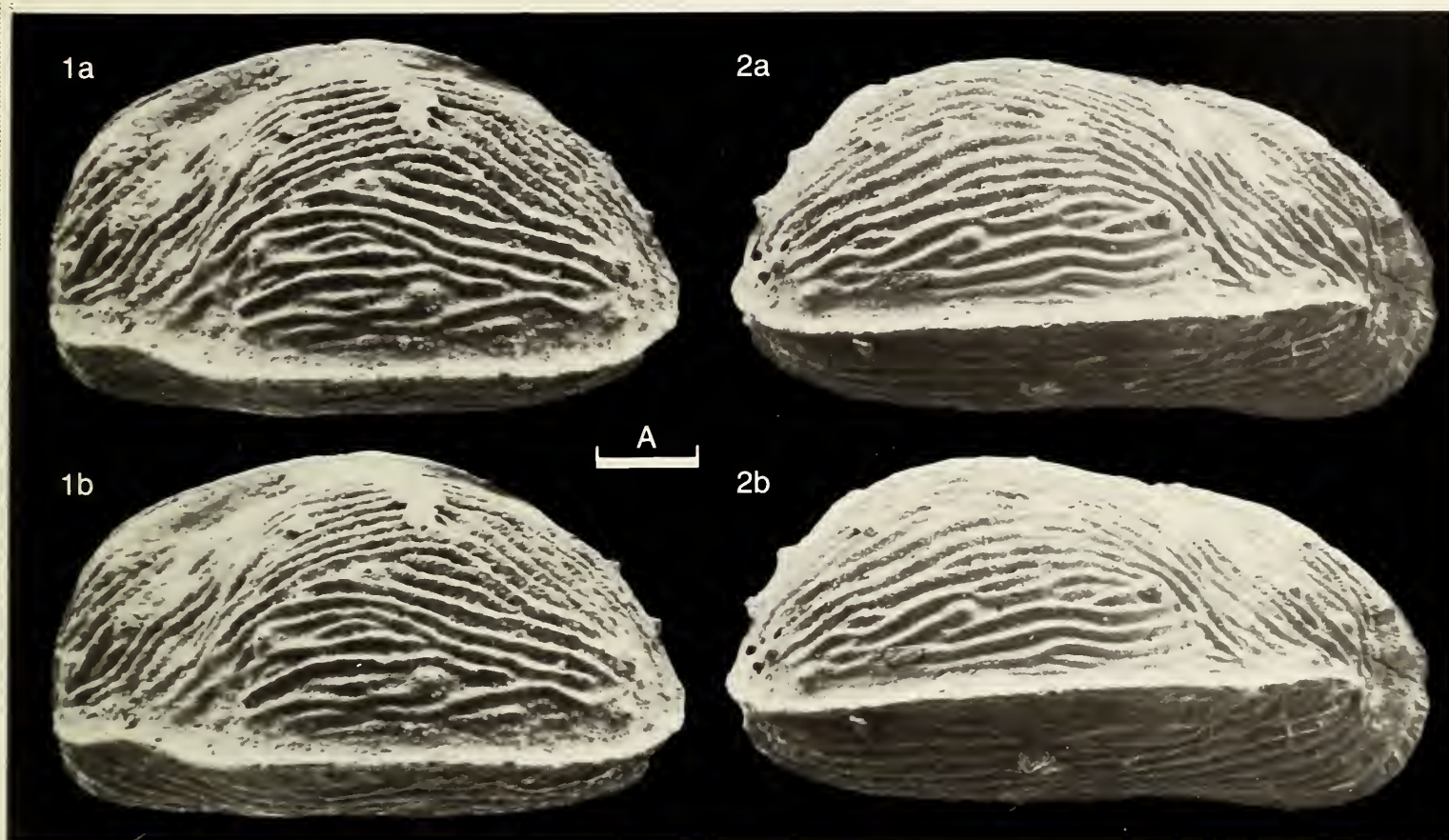
Diagnosis: A moderate sized *Timiriasevia* species; strongly dimorphic – females larger than males, carapace ovate (male) or truncate pyriform (female) in dorsal view. Valves semicircular to elongate triangular in lateral view. Posteroventral inflation in female valves; truncated posterior in males. Sulcus along dorsal margin of carapace. Ventral surface planar. Valves strongly ornamented with sub-concentric costae in reduced numbers and more widely spaced than is typical for the genus; marked development of horizontal keel in ventrolateral region; strongly noded. Hinge lophodont: prominent median element, shorter terminal elements. Wide accommodation groove in larger left valve. Radial pore canals short, straight and simple, up to 35 anteriorly. Inner margin and line of concrescence do not coincide.

Remarks: Although differences in the strength of costate ornamentation are slight, variations in the strength of noding are more obvious within the sample population (99 valves and carapaces). Some variability in valve outline and carapace shape, independent of sexual dimorphism and similar to that illustrated by Clements in *T. mackerrowi* Bate (*Stereo-Atlas Ostracod Shells*, 2, 117–124, 1974) was also observed. Only one A-1 and one A-2 specimen were recovered. *T. mackerrowi* differs on account of its weaker costate ornament and lack of ventrolateral keel, but the positions of nodes and pattern of ornamentation are similar in both species.

Timiriasevia sp. A of Bate, 1965 (*Palaeontology*, 8, 758, pl. 3) possesses a ventrolateral keel but is lozenge shaped, smaller, and un-noded. *T. epidiformis* Mandelstam, 1947 from the middle Jurassic of the Mangyshlak Peninsular, U.S.S.R. (*All-Union Petrol. Scientific Res. Geol. Prosp. Inst.* 5, 6, 22–24), is similarly lozenge shaped but lacks a ventrolateral keel. *T. principalis* Lyubimova, 1956, from the upper Cretaceous of Mongolia (*Trudy vses. nef. nauchno—issled. geol.—razv. Inst. [VNIGRI]*, 93, 129, 130. pl. 24, figs. 1a, b) is a larger and more weakly ornamented species similarly lacking a ventrolateral keel. *T. humilis* Zhong, 1964 and *T. shensiensis* Zhong, 1964, from the middle Jurassic of Shenshi Province, China (*Acta Pal. Sinica*, 12, 457, pl. 2, figs. 14–16; 456, pl. 2, figs. 1–7) are both weakly ornamented. *T. digitalis* Govindan, 1975, from the Kota Limestone of India (*Palaeontology*, 18, 207–216, pl. 13), is strongly costate

Explanation of Plate 15, 52

Fig. 1, ♂ LV, ext. lat. (paratype, OS 12994, 615µm long); fig. 2, ♂ RV, ext. lat. (paratype, OS 12995, 580µm long).
Scale A (100µm; x 155), figs. 1, 2.



Remarks (cont.): yet is larger and lacks a keel. *Timiriasevia* sp. I of Brenner, 1976, from the Spanish Wealden (*Palaeontographica*, Abt. A, **152**, 113–201), is a keeled species although otherwise not similarly ornamented. *Timiriasevia* sp. of Malz (*Senckenberg. leth.*, **66**, 311, pl. 8, figs. 88–90) from the lower Bajocian of Sardinia is similar though less elongate and with a smaller keel. *Timiriasevia* sp. I of Rohr (*op. cit.*) appears to be conspecific with *T. uptoni* although further examination needs to be made. Similarities between the last two species and *T. uptoni* might suggest an evolutionary lineage from the lower Bajocian to upper Bathonian.

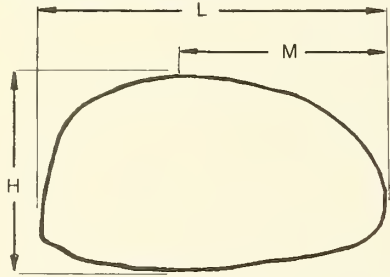
Distribution: Confirmed occurrence only from the type locality and horizon where it occurs in association with other oligohaline-mesohaline ostracods including *Timiriasevia triangularis* Timberlake (*Stereo-Atlas Ostracod Shells* **15**, 57–68, 1988). *T.* sp. I of Rohr occurs in a middle Bathonian horizon within a limestone and lignite sequence at Les Grands Causses, southern France.

| Sex | L (mm) | | | | | M (mm) | | | H (mm) | | | | | L/M | | | L/H | | |
|------|--------|-----------|------|------|------|--------|-----------|------|--------|-----------|------|------|------|-----|-----------|------|-----|-----------|------|
| | N | \bar{x} | SD | Max | Min | N | \bar{x} | SD | N | \bar{x} | SD | Max | Min | N | \bar{x} | SD | N | \bar{x} | SD |
| ♀♀LV | 17 | 0.63 | .044 | 0.74 | 0.56 | 10 | 0.39 | .03 | 17 | 0.39 | .031 | 0.45 | 0.34 | 10 | 1.74 | .088 | 10 | 1.66 | .098 |
| ♀♀RV | 18 | 0.66 | .056 | 0.79 | 0.60 | 10 | 0.39 | .036 | 18 | 0.35 | .03 | 0.42 | 0.31 | 10 | 1.74 | .142 | 18 | 1.87 | .12 |
| ♂♂LV | 10 | 0.56 | .046 | 0.64 | 0.48 | 7 | 0.33 | .024 | 10 | 0.35 | .02 | 0.40 | 0.33 | 7 | 1.80 | .086 | 7 | 1.60 | .078 |
| ♂♂RV | 15 | 0.55 | .023 | 0.59 | 0.50 | 11 | 0.36 | .025 | 15 | 0.31 | .016 | 0.35 | 0.29 | 11 | 1.74 | .073 | 11 | 1.78 | .056 |

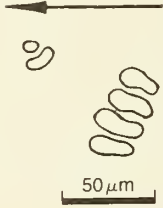
Table 1. Measurements on specimens from sample T5BI (type locality). N = no. of specimens; \bar{x} = mean; SD = standard deviation: for dimensions L, M and H see Text-fig. 1.

Explanation of Plate 15, 54

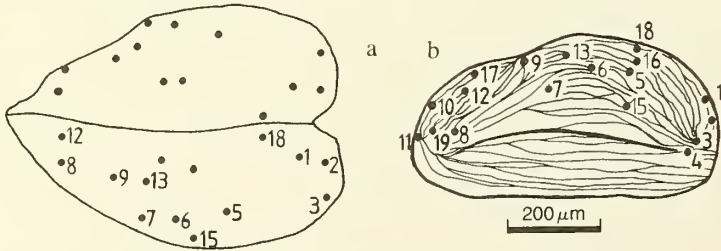
Fig. 1 ♀ car., ext. dors. (paratype, OS 12996, 645µm long); fig. 2, ♀ car., ext. vent. (paratype, OS 12997, 665µm long); fig. 3. ♂ car., ext. dors. (paratype, OS 12998, 580µm long).
Scale A (100µm; × 100), fig. 1; scale B (100µm; × 110), figs. 2, 3.



Text-fig. 1. Outline of adult ♂ RV with measured dimensions (Table 1) indicated.



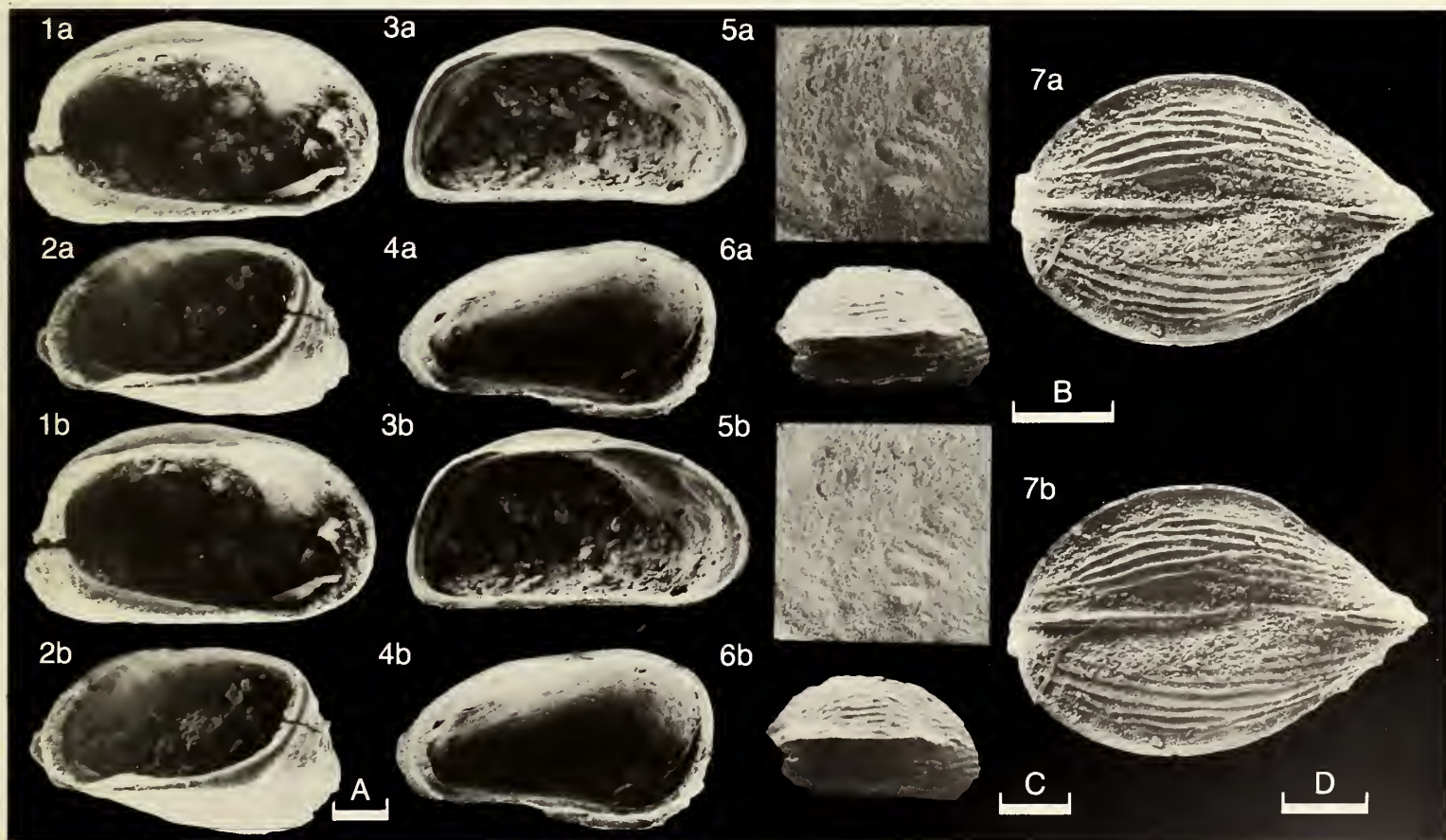
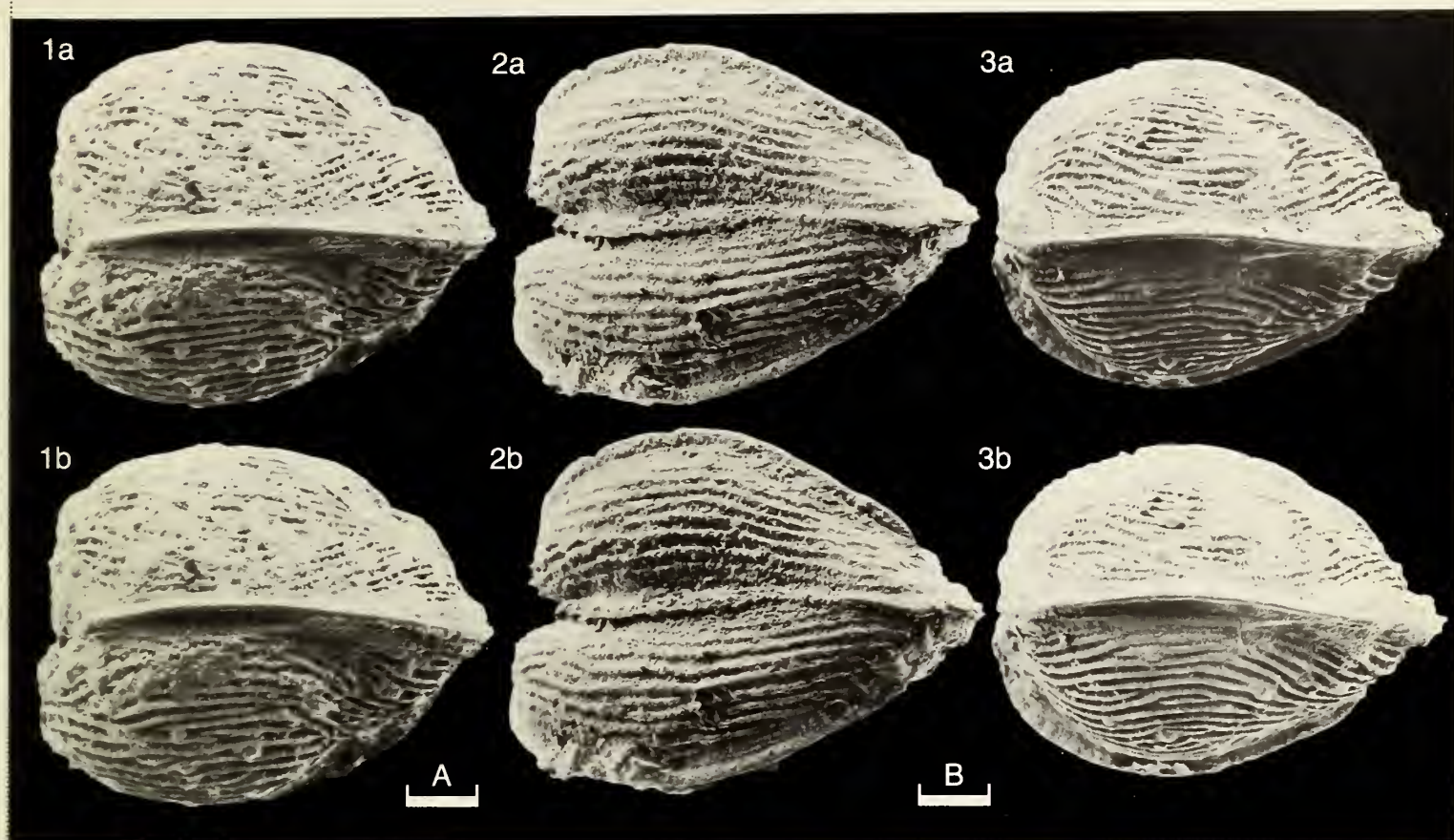
Text-fig. 2. Muscle scar pattern, RV int. lat.



Text-fig. 3. Positions of nodes on: a, ♀ car. dors.; b, ♀ LV.

Explanation of Plate 15, 56

Fig. 1, ♀ LV, int. lat. (paratype, OS 13000, 580µm long); fig. 2, ♀ RV, int. lat. (paratype, OS 13081, 545µm long); fig. 3, ♂ LV, int. lat. (paratype, OS 13082, 555µm long); fig. 4, ♂ RV, int. lat. (paratype, OS 13083, 495µm long); fig. 5, ♂ RV, int. muscle scars (paratype, OS 13083); fig. 6, A-2 juv. RV, ext. lat. (paratype, OS 13084, 340µm long); fig. 7, ♂ car., ext. vent. (paratype, OS 12999, 550µm long).
Scale A (100µm; × 80), figs. 1–4; scale B (50µm; × 280), fig. 5; scale C (100µm; × 90), fig. 6; scale D (100µm; × 110), fig. 7.



ON *TIMIRIASEVIA TRIANGULARIS* TIMBERLAKE sp. nov.

by Simon Timberlake
(Sedgwick Museum, University of Cambridge)

Timiriasevia triangularis sp. nov.

Holotype: British Museum (Nat. Hist.) no. OS 12979; ♀ LV.
[Paratypes: nos. OS 12980–12991, OS 13065–13080].

Type locality: SE section of old clay pit near the 'Round House', Tarlton, Cirencester, Gloucestershire, England (Nat. Grid Ref. SO 970000); non-marine band in Forest Marble Clay. Pale grey marly clay, 23–53 cm below base of the Lower Cornbrash Limestone, Bathonian, middle Jurassic.

Derivation of name: Latin, alluding to the shape of the valves.

Figured specimens: British Museum (Nat. Hist.) nos. OS 12979 (holotype, ♀ LV: Pl. 15, 58, fig. 1), OS 12980 (paratype, ♀ RV: Pl. 15, 58, fig. 2), OS 12981 (paratype, ♂ LV: Pl. 15, 60, fig. 1), OS 12982 (paratype, ♂ RV: Pl. 15, 60, fig. 2), OS 12983 (paratype, ♀ car.: Pl. 15, 62, fig. 1), OS 12984 (paratype, ♀ car.: Pl. 15, 62, fig. 2), OS 12985 (paratype, ♂ car.: Pl. 15, 62, fig. 3), OS 12986 (paratype, ♂ car.: Pl. 15, 64, fig. 6), OS 12987 (paratype, ♀ RV: Pl. 15, 64, fig. 1), OS 12988 (paratype, ♀ LV: Pl. 15, 64, figs. 3, 5), OS 12989 (paratype, ♂ RV: Pl. 15, 64, fig. 2), OS 12990 (paratype, ♂ LV: Pl. 15, 64, fig. 4), OS 12991 (paratype, ♀ A–1 juv. car.: Pl. 15, 66, fig. 1), OS 13065 (paratype, ♂ A–1 juv. car.: Pl. 15, 66, fig. 2), OS 13066 (paratype, ♀ A–1 juv. RV: Pl. 15, 66, fig. 3), OS 13067 (paratype, ♂ A–1 juv. RV: Pl. 15, 66, fig. 4), OS 13068 (paratype, ♀ A–2 juv. car.: Pl. 15, 66, fig. 5), OS 13069 (paratype, ♂ A–2 juv. car.: Pl. 15, 66, fig. 6), OS 13070

Explanation of Plate 15, 58

Fig. 1, ♀ LV, ext. lat. (holotype, OS 12979, 560 µm long); fig. 2, ♀ RV, ext. lat. (paratype, OS 12980, 580 µm long).
Scale A (100 µm; ×160), figs. 1, 2.

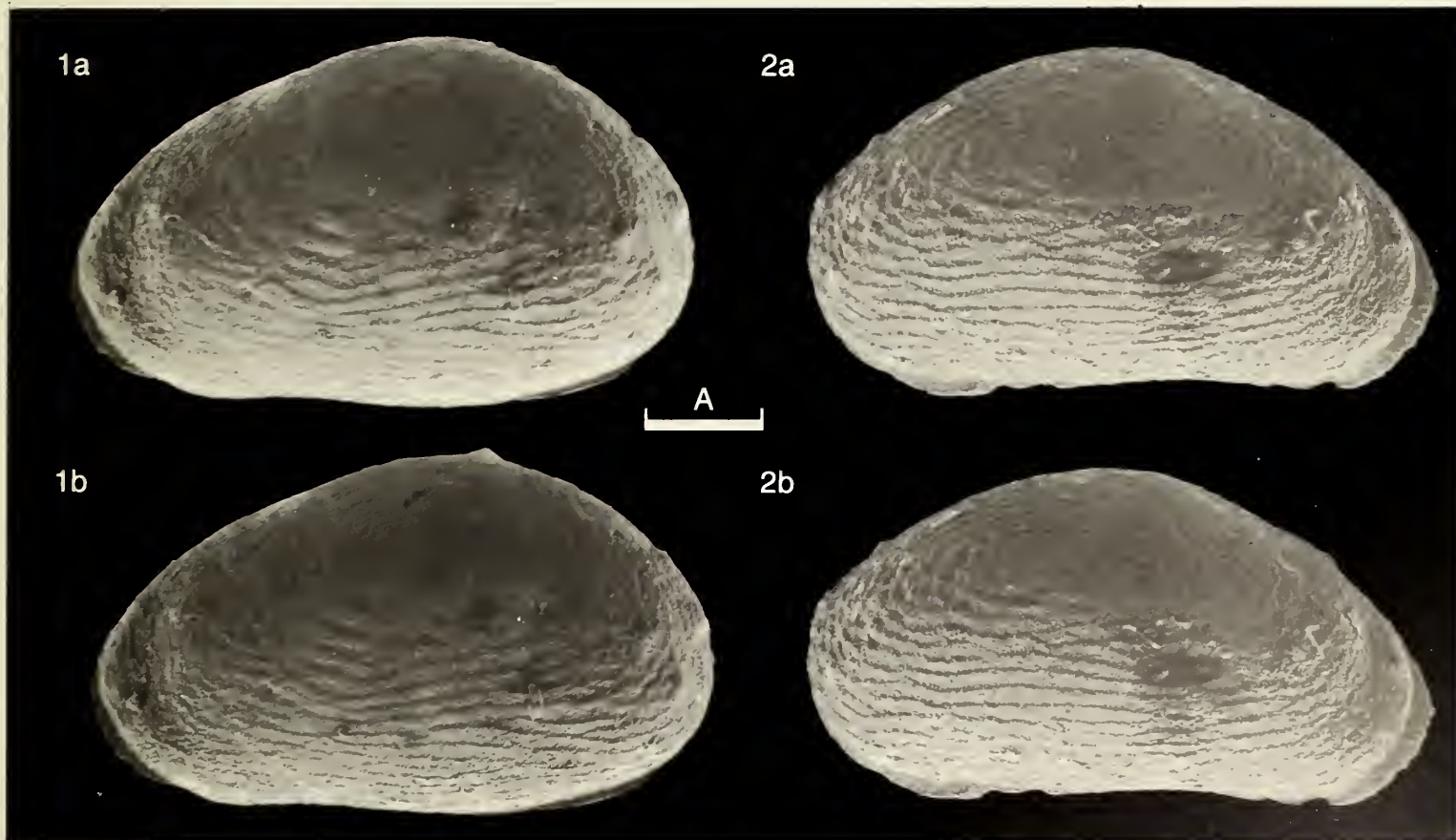
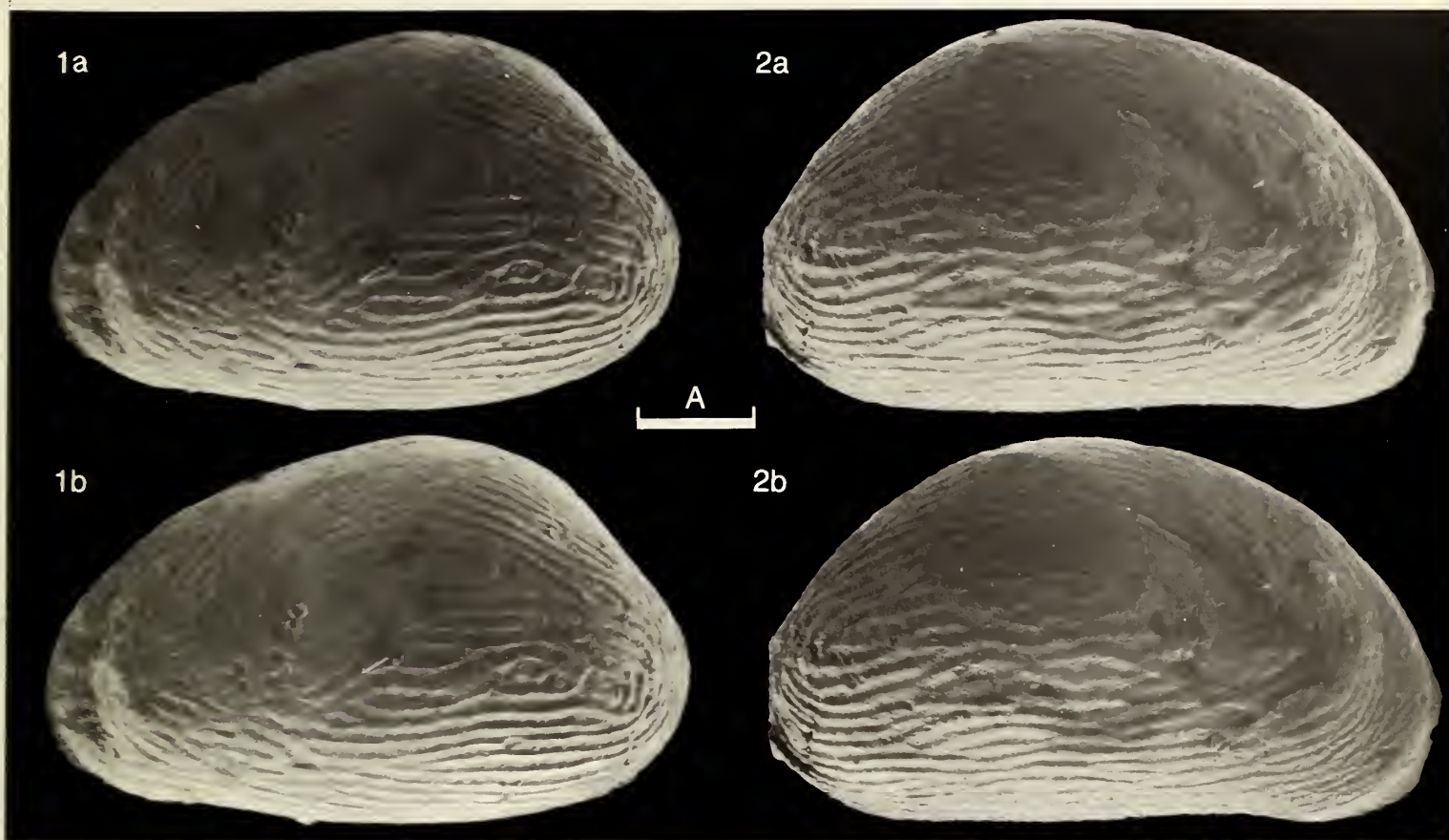
Figured specimens (paratype, ♀ A–2 juv. LV: Pl. 15, 66, fig. 7), OS 13071 (paratype, ♂ A–2 juv. LV: Pl. 15, 66, fig. 8), OS 13072 (paratype, ♀ A–3 juv. car.: Pl. 15, 68, fig. 1), OS 13073 (paratype, ♂ A–3 juv. car.: Pl. 15, 68, fig. 2), OS 13074 (paratype, ♀ A–3 juv. RV: Pl. 15, 68, fig. 3), OS 13075 (paratype, ♂ A–3 juv. RV: Pl. 15, 68, fig. 4), OS 13076 (paratype, ♀ A–4 juv. LV: Pl. 15, 68, fig. 5), OS 13077 (paratype, ♂ A–4 juv. LV: Pl. 15, 68, fig. 6), OS 13078 (paratype, ♀ A–5 juv. RV: Pl. 15, 68, figs. 7, 9), OS 13079 (paratype, ♂ A–5 juv. RV: Pl. 15, 68, fig. 8), OS 13080 (paratype, ♂ A–5 juv. car.: Pl. 15, 68, fig. 10).

The paratypes are from the same sample (T5BI) as the holotype or from sample T6A, both pale grey marly clay, respectively 46–53 and 31–38 cms below the base of the Lower Cornbrash Limestone at the type locality.

Diagnosis: A strongly dimorphic *Timiriasevia* species: females larger than males, carapace ovate (male) or pyriform (female) in dorsal view, with a strong posteroventral inflation beyond the outer margin in the latter. Valves subtriangular in lateral view; greatest height at or near mid-length in male, behind mid-length in female. Valves of both sexes have pronounced anterior marginal flanges. Left valve larger than right. Valves weakly ornamented with 'finger print' striations sub-concentric to valve margins, slightly stronger in ventral and posterior regions and more developed in females than males. Hinge simple, lophodont: short median and posterior elements, longer anterior element. Inner margin and line of concrescence do not coincide anteriorly or posteriorly. Radial pore canals few, short, straight and simple.

Explanation of Plate 15, 60

Fig. 1, ♂ LV, ext. lat. (paratype, OS 12981, 535 µm long); fig. 2, ♂ RV, ext. lat. (paratype, OS 12982, 525 µm long).
Scale A (100 µm; ×160), figs. 1, 2.



| (A) Sex | | L (mm) | | | | | M (mm) | | | H (mm) | | | | | L/M | | | L/H | | |
|---------|----|--------|-----------|------|------|------|--------|-----------|------|--------|-----------|------|------|------|-----|-----------|------|-----|-----------|------|
| | | N | \bar{x} | SD | Max | Min | N | \bar{x} | SD | N | \bar{x} | SD | Max | Min | N | \bar{x} | SD | N | \bar{x} | SD |
| ♀♀ | LV | 32 | 0.61 | .043 | 0.72 | 0.55 | 11 | 0.38 | .036 | 32 | 0.39 | .021 | 0.44 | 0.34 | 11 | 1.82 | .094 | 32 | 1.54 | .07 |
| ♀♀ | RV | 33 | 0.61 | .041 | 0.73 | 0.56 | 6 | 0.40 | .034 | 33 | 0.37 | .019 | 0.43 | 0.34 | 6 | 1.80 | .02 | 33 | 1.64 | .05 |
| ♂♂ | LV | 11 | 0.57 | .042 | 0.63 | 0.52 | 11 | 0.33 | .026 | 11 | 0.37 | .028 | 0.42 | 0.33 | 11 | 1.76 | .126 | 11 | 1.53 | .10 |
| ♂♂ | RV | 35 | 0.53 | .029 | 0.6 | 0.49 | 16 | 0.34 | .016 | 35 | 0.34 | .022 | 0.39 | 0.30 | 16 | 1.66 | .08 | 35 | 1.56 | .055 |

| (B) Sex | | L (mm) | | | | | G (mm) | | | W (mm) | | | | | L/G | | | L/W | | |
|---------|---|--------|-----------|------|------|------|--------|-----------|------|--------|-----------|------|------|------|-----|-----------|------|-----|-----------|------|
| | | N | \bar{x} | SD | Max | Min | N | \bar{x} | SD | N | \bar{x} | SD | Max | Min | N | \bar{x} | SD | N | \bar{x} | SD |
| ♀♀ | C | 14 | 0.70 | .066 | 0.81 | 0.58 | 14 | 0.41 | .046 | 14 | 0.49 | .071 | 0.60 | 0.30 | 14 | 1.69 | .148 | 14 | 1.44 | .128 |
| ♂♂ | C | 23 | 0.57 | .05 | 0.64 | 0.48 | 23 | 0.33 | .028 | 23 | 0.38 | .035 | 0.44 | 0.30 | 23 | 1.69 | .112 | 23 | 1.52 | .097 |

Table 1. Measurements on specimens from sample T5BI (type locality and horizon). N=no. of specimens; \bar{x} =mean; SD=standard deviation; for explanation of dimensions L, M, H, G, and W see Text-figs. 2, 3. A = valves; B = carapaces.

Remarks: Significant variations in the strength of the ornament were observed in the sample populations: at low magnification some valves appeared almost smooth. Apart from sexual dimorphism there is some minor variability in carapace shape plus a wide size range of adult individuals (see Table 1). All juvenile instars down to A-6 appear to exhibit precocious sexual dimorphism, distinguishable on instar diagrams (Text-fig. 1) and from details of shape and position of maximum width and height in valves and carapaces. As a rule, maximum height and width are behind mid-length in proto-females, at or near mid-length in proto-males. Throughout ontogeny proto-males are

Explanation of Plate 15, 62

Fig. 1, ♀ car., dors. (paratype, OS 12983, 675 μ m long); fig. 2, ♀ car., vent. (paratype, OS 12984, 630 μ m long); fig. 3, ♂ car., dors. (paratype, OS 12985, 515 μ m long).

Scale A (100 μ m; $\times 100$), figs. 1, 2; scale B (100 μ m; $\times 115$), fig. 3.

Remarks (cont.): slightly higher than females; length and width are not dimorphic until the A-1 instar, at which point the proto-female becomes distinctly longer and more inflated than the proto-male.

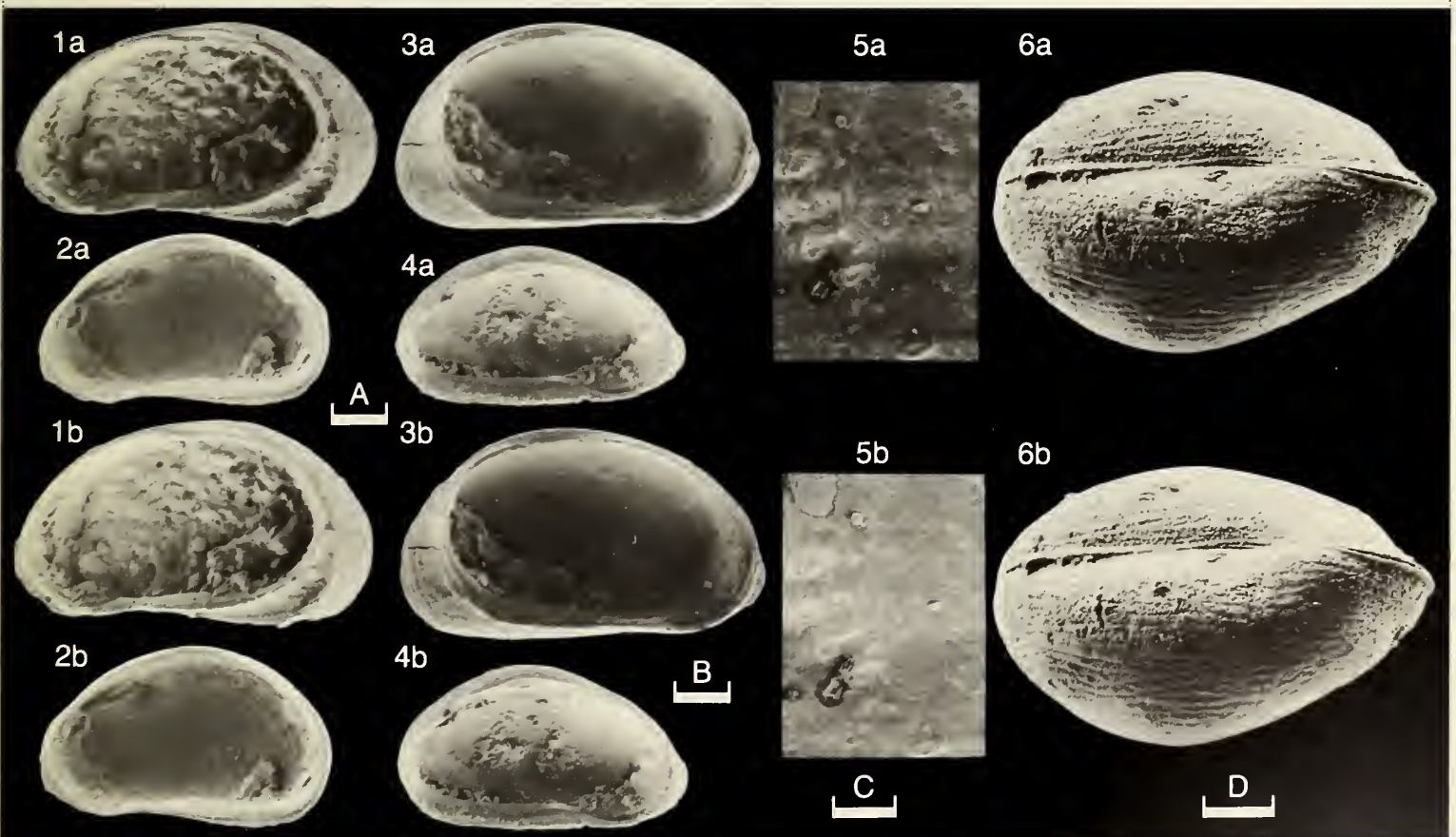
Although similar to *T. mackerrowi* Bate, 1965 (*Palaeontology*, 8, 756–758, pl. 3, figs. 2–12; see R. Clements, *Stereo-Atlas Ostracod Shells*, 2, 117–124, 1974) in a number of respects, the weaker yet characteristic ornament and triangular profile of *T. triangularis* suggest that it is a distinct species. Specimens of *T. mackerrowi* from the Algarve of Portugal (F. F. Helmdach and M. M. Ramalho, *Revue Micropaléont.*, 19, (3), 1976) exhibit a similar posteroventral inflation and subtriangular outline, but are strongly costate. *Timiriasevia*? sp. (H. Malz, *Senckenberg. leth.*, 66, 31, pl. 8, figs. 80–82, 1985), from the Bajocian of Sardinia is smaller and differently ornamented. *T. triangularis* is easily distinguished from *T. humilis* Zhong, 1964 and *T. shensiensis* Zhong, 1964 from the middle Jurassic of Shensi Province, China (*Acta Pal. Sinica*, 12, 457, pl. 2, figs. 14–16; 456, pl. 2, figs. 1–7). *T. humilis* is narrow and lozenge-shaped, and *T. shensiensis* possesses a somewhat different selvage structure. Carapaces of *T. armeniacumiformis* Zhong, 1964 (*Acta Pal. Sinica*, 12, 456, pl. 2, figs. 8–13) are rather different in outline: sub-elliptical in lateral view and sub-fusiform in dorsal view. *T. principalis* Lyubimova 1956, from the Cretaceous of Mongolia (*Trud̆y vses. nef. nauchno – issled. geol. – razv. Inst. (VNIGRI)*, 93, 129, 130, pl. 24, figs. 1a, b), differs in its pattern of ornament and lack of any pronounced anterior marginal flange.

Distribution: Known only from the type locality and horizon, where it occurs with *T. mackerrowi*, *T. uptoni* Timberlake (*Stereo-Atlas Ostracod Shells*, 15, 49–56, 1988), an unnamed *Timiriasevia* species, *Theriosynoecum kirtlingtonensis* Bate, *Bisulcocypris anglica* Bate, plus a number of darwinulacean and cypridacean ostracods, charophytes and non-marine gastropods; marine/brackish elements are also present. *T. mackerrowi* and *T. triangularis*, along with *Theriosynoecum kirtlingtonensis*, are the most certainly autochthonous species. The salinity range represented is probably oligohaline-mesohaline.

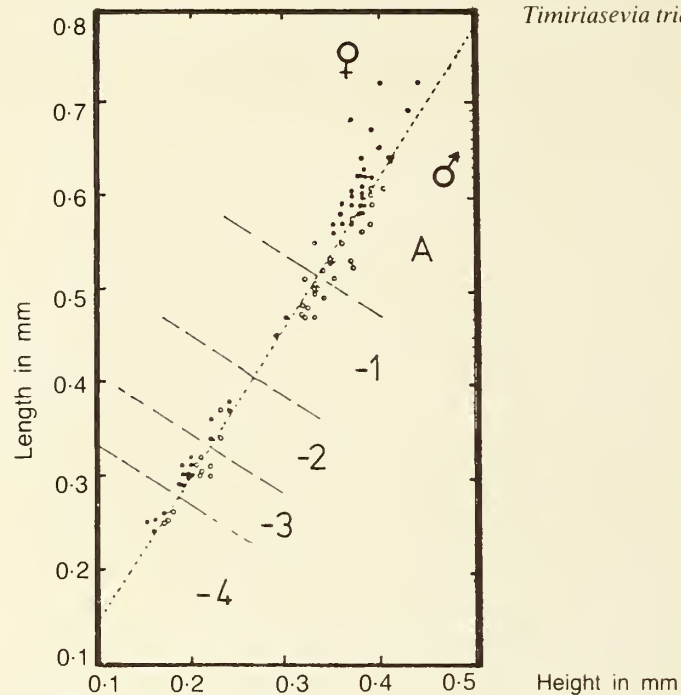
Explanation of Plate 15, 64

Fig. 1, ♀ RV, int. lat. (paratype, OS 12987, 555 μ m long); fig. 2, ♂ RV, int. lat. (paratype, OS 12989, 505 μ m long); fig. 3, ♀ LV, int. lat. (paratype, OS 12988, 640 μ m long); fig. 4, ♂ LV, int. lat. (paratype, OS 12990, 510 μ m long); fig. 5, ♀ LV, detail of muscle scars (paratype, OS 12988); fig. 6, ♂ car., vent. (paratype, OS 12986, 540 μ m long).

Scale A (100 μ m; $\times 90$), fig. 1; scale B (100 μ m; $\times 80$), figs. 2, 3, 4; scale C (50 μ m; $\times 190$), fig. 5; scale D (100 μ m; $\times 115$), fig. 6.



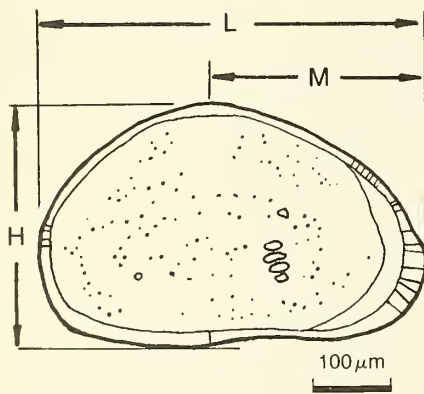
Text-fig. 1. Ontogeny of *T. triangularis*; all left valves. ○ = ♂; ● = ♀; sample T5BI.



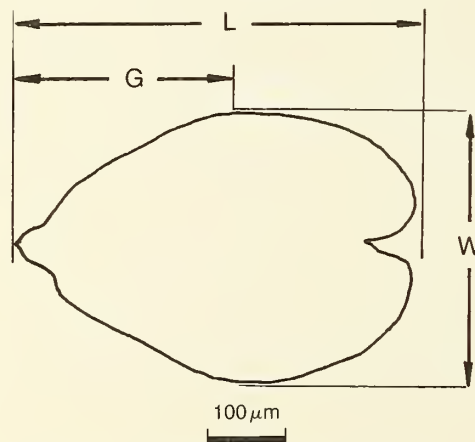
Explanation of Plate 15, 66

Fig. 1, ♀ A-1 juv. car., dors. (paratype, OS 12991, 450 μm long); fig. 2, ♂ A-1 juv. car., dors. (paratype, OS 13065, 400 μm long); fig. 3, ♀ A-1 juv. RV, ext. lat. (paratype, OS 13066, 420 μm long); fig. 4, ♂ A-1 juv. RV, ext. lat. (paratype, OS 13067, 360 μm long); fig. 5, ♀ A-2 juv. car., dors. (paratype, OS 13068, 330 μm long); fig. 6, ♂ A-2 juv. car., dors. (paratype, OS 13069, 340 μm long); fig. 7, ♀ A-2 juv. LV, ext. lat. (paratype, OS 13070, 340 μm long); fig. 8, ♂ A-2 juv. LV, ext. lat. (paratype, OS 13071, 330 μm long).

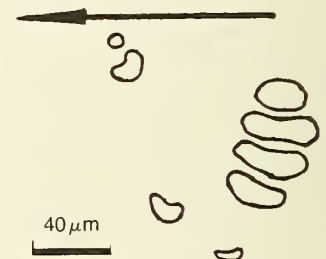
Scale A (100 μm; ×100), figs. 1-8.



Text-fig. 2. Adult ♂ RV ext. lat. in transmitted light showing muscle scars, normal pores and marginal pore canals; measured dimensions (Table 1) indicated.



Text-fig. 3. Outline of adult ♀ car.; measured dimensions (Table 1) indicated.

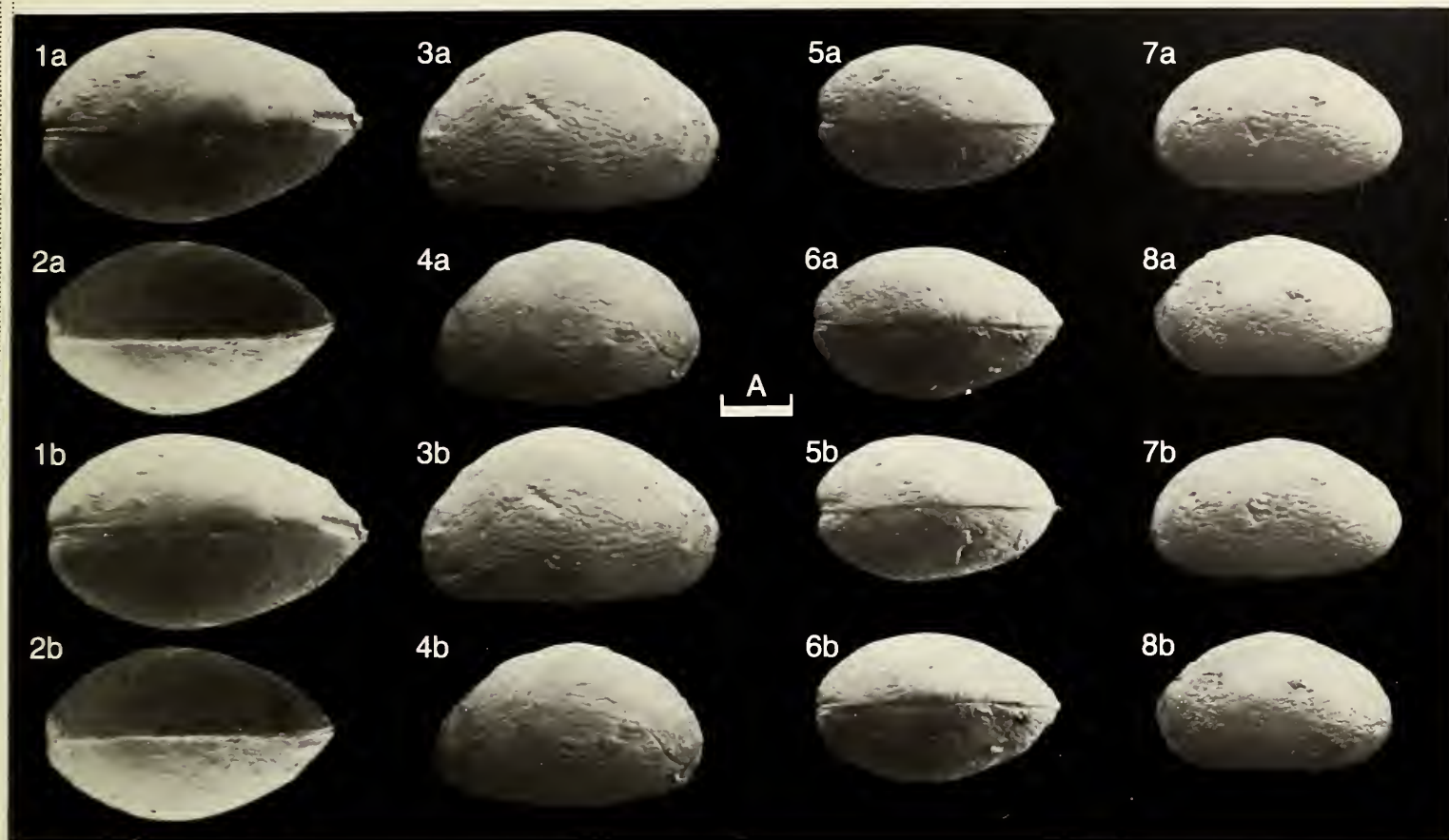


Text-fig. 4. Muscle scar pattern, ♂ RV int. lat.

Explanation of Plate 15, 68

Fig. 1, ♀ A-3 juv. car., dors. (paratype, OS 13072, 285 μm long); fig. 2, ♂ A-3 juv. car. dors. (paratype, OS 13073, 290 μm long); fig. 3, ♀ A-3 juv. RV, ext. lat. (paratype, OS 13074, 275 μm long); fig. 4, ♂ A-3 juv. RV, ext. lat. (paratype, OS 13075, 290 μm long); fig. 5, ♀ A-4 juv. LV, ext. lat. (paratype, OS 13076, 245 μm long); fig. 6, ♂ A-4 juv. LV, ext. lat. (paratype, OS 13077, 245 μm long); fig. 7, ♀ A-5 juv. RV, ext. lat. (paratype, OS 13078, 195 μm long); fig. 8, ♂ A-5 juv. RV, ext. lat. (paratype, OS 13079, 195 μm long); fig. 9, ♀ A-5 juv. RV, vent. (paratype, OS 13078, 195 μm long); fig. 10, ♂ A-5 juv. car., dors. (paratype, OS 13080, 205 μm long).

Scale A (100 μm; ×120), figs. 1-4; scale B (100 μm; ×140), figs. 5-10.



ON *AMPHIEXOPHTHALMOCYTHERE OERTLII* (BABINOT)

by J. F. Babinot & J. P. Colin

(Université de Provence, Centre St. Charles, Marseille & Esso Research, Bègles, France)

Genus *AMPHIEXOPHTHALMOCYTHERE* Gründel, 1975

Type-species (by original designation): *Exophthalmocythere oertlii* Babinot, 1971

Diagnosis: Medium-sized carapace, flattened; posterior end acuminate in the upper half of valve height. Valve surface reticulate with strongly developed nodes and spines. Prominent nodes occur especially at the posterodorsal angle and (two) along the ventral margin. Eye tubercle well developed; subcentral tubercle more or less well developed; hinge amphidont (heterodont/slightly hemiamphidont). Marginal zones moderately wide without vestibulum.

Remarks: The type-species has been originally assigned to the late Jurassic/early Cretaceous genus *Exophthalmocythere* Triebel, 1938 on the basis of its overall shape, ornamentation and prominent eye-tubercle. In fact this genus is more rectangular, less ornamented (absence of strong nodes and long spines) and the anterior tooth on the right valve is crenulate. The early Cretaceous genus *Parexophthalmocythere* Oertli, 1959, has no subcentral tubercle, its ornamentation is less developed and its hinge has more crenulate elements. We therefore think that *Amphiexophthalmocythere* should be considered as a genus, not a subgenus of *Parexophthalmocythere* Oertli, 1959. Moreover, it belongs to the family Trachyleberididae, not the Progonocytheridae as previously suggested; it is related to the genus *Navarracythere* Colin & Rodriguez-Lázaro, also from the north Tethyan Cretaceous (see *Stereo-Atlas Ostracod Shells* 13 (13), 63–66, 1986).

Explanation of Plate 15, 70

Fig. 1, ♂ car., ext. lt. lat. (EPR-E 23458, 720 µm long); fig. 2, ♀ car. ext. rt. lat. (EPR-E 23459, 720 µm long); fig. 3, ♂ car. ext. dors. (EPR-E 23460, 730 µm long).

Scale A (100 µm; × 86), figs. 1-3.

Amphiexophthalmocythere oertlii (Babinot, 1971)

1959 *Cythereis* sp. H. J. Oertli, *Paläont. Z.*, **33**, 4, 246, pl. 32, fig. 9.

1965 *Cythereis* sp. 1 Oertli; P. Saint-Marc, *Thesis Univ. Paris*, 156, pl. 22, fig. 10, pl. 19, fig. 20.

1971 *Exophthalmocythere oertlii* n.sp. J. F. Babinot, *Rev. Micropaléontol.*, **13**, 4, 237, pl. 1, figs. 1, 2.

1971 *Parexophthalmocythere oertlii* (Babinot) (sic); R. Damotte, *Rev. Micropaléontol.*, **14**, 1, 18, pl. 3, figs. 19a-d.

1973 *Exophthalmocythere oertlii* Babinot; J. P. Colin, *Thesis Univ. Paris*, 181, pl. 19, fig. 4.

1975 *Parexophthalmocythere* (*Amphiexophthalmocythere*) *oertlii* (Babinot); J. Gründel, *Freiberger ForschHft*, **C 304**, 34, fig. 2.

1980 *Parexophthalmocythere* (*Amphiexophthalmocythere*) *oertlii* (Babinot); J. F. Babinot, *Trav. Lab. Géol. hist. Paléontol. Univ. Provence*, **10**, 119, pl. 15, figs. 4-10.

1983 *Parexophthalmocythere* (*Amphiexophthalmocythere*) *oertlii* (Babinot); J. F. Babinot & J. P. Colin, in R. F. Maddocks (ed.), *Applications of Ostracoda*, fig. 10A, Univ. Houston Geosciences, Texas.

1985 *Parexophthalmocythere* (*Amphiexophthalmocythere*) *oertlii* (Babinot); J. F. Babinot, J. P. Colin & R. Damotte, *Bull. Centres Rech. Explor.-Prod. Elf-Aquitaine, Mém.*, **9**, pl. 58, figs. 10-12.

1985 *Amphiexophthalmocythere oertlii* (Babinot); J. P. Colin & R. Damotte, *Cretaceous Research*, **6**, 158, fig. 1.

Holotype: Université de Provence, Marseille, Laboratoire de Stratigraphie et Paléoécologie, no. HCE7; carapace.

Type-locality: La Bégude, 3 km S of Le Camp-du-Castellet, Var, SE. France; approx. lat. 47° 55' N, long. 3° 45' E. Late Cenomanian, upper Cretaceous. In marly limestone with benthic larger foraminifera (alveolinids), oysters and organic matter.

Figuredspecimens: Esso Production Research-European, Bègles, France, nos. 23458 (♂ car.: Pl. 15, 70 fig. 1), 23459 (♀ car.: pl. 15, 70, fig. 2), 23460 (♂ car.: Pl. 15, 70, fig. 3), 23461 (♀ LV: Pl. 15, 72, fig. 1), 23462 (♂ RV: Pl. 15, 72, fig. 2), 23463 (♀ car.: Pl. 15, 72, fig. 3).

All the figured specimens are from the late Cenomanian of the type-locality.

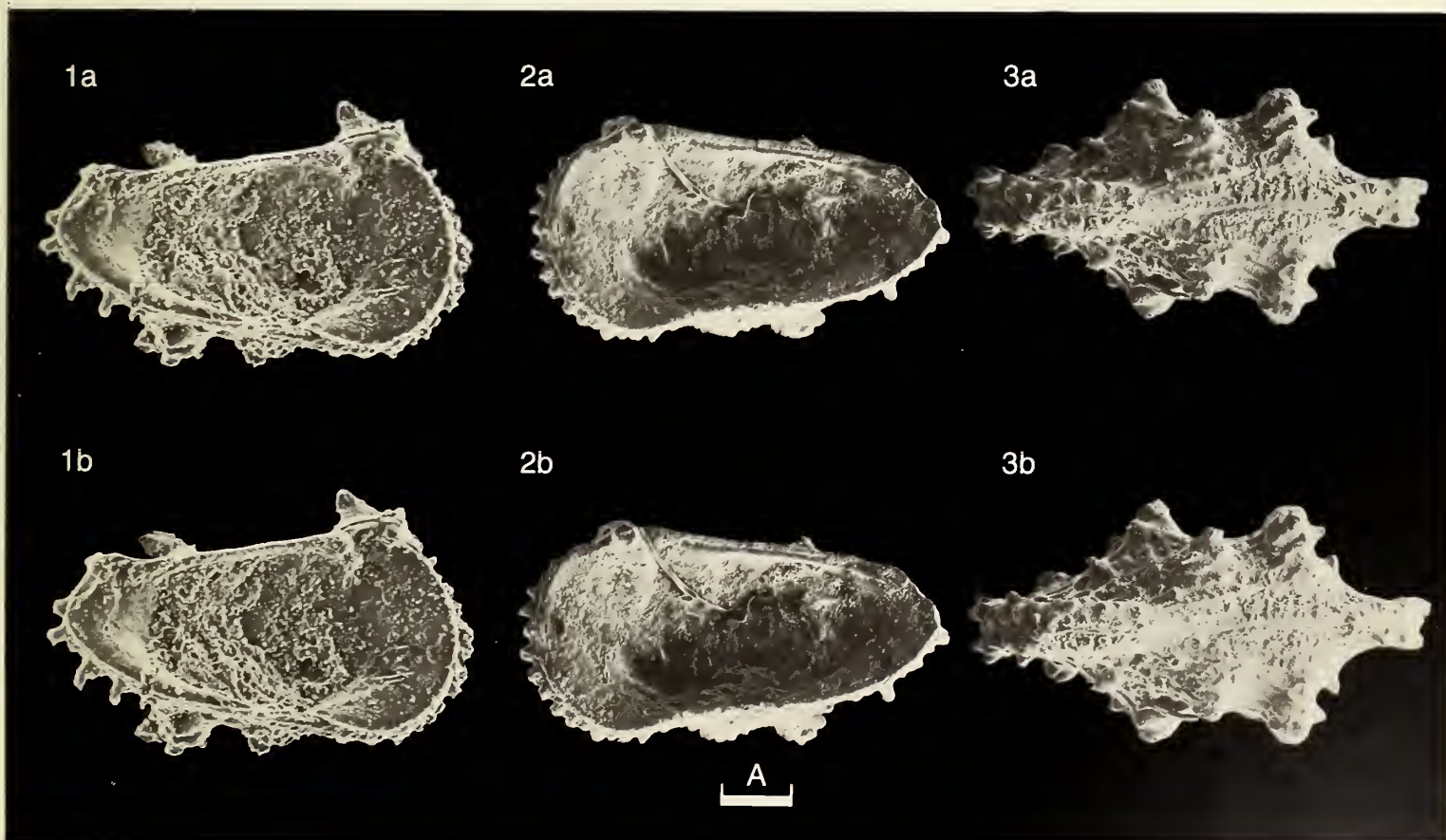
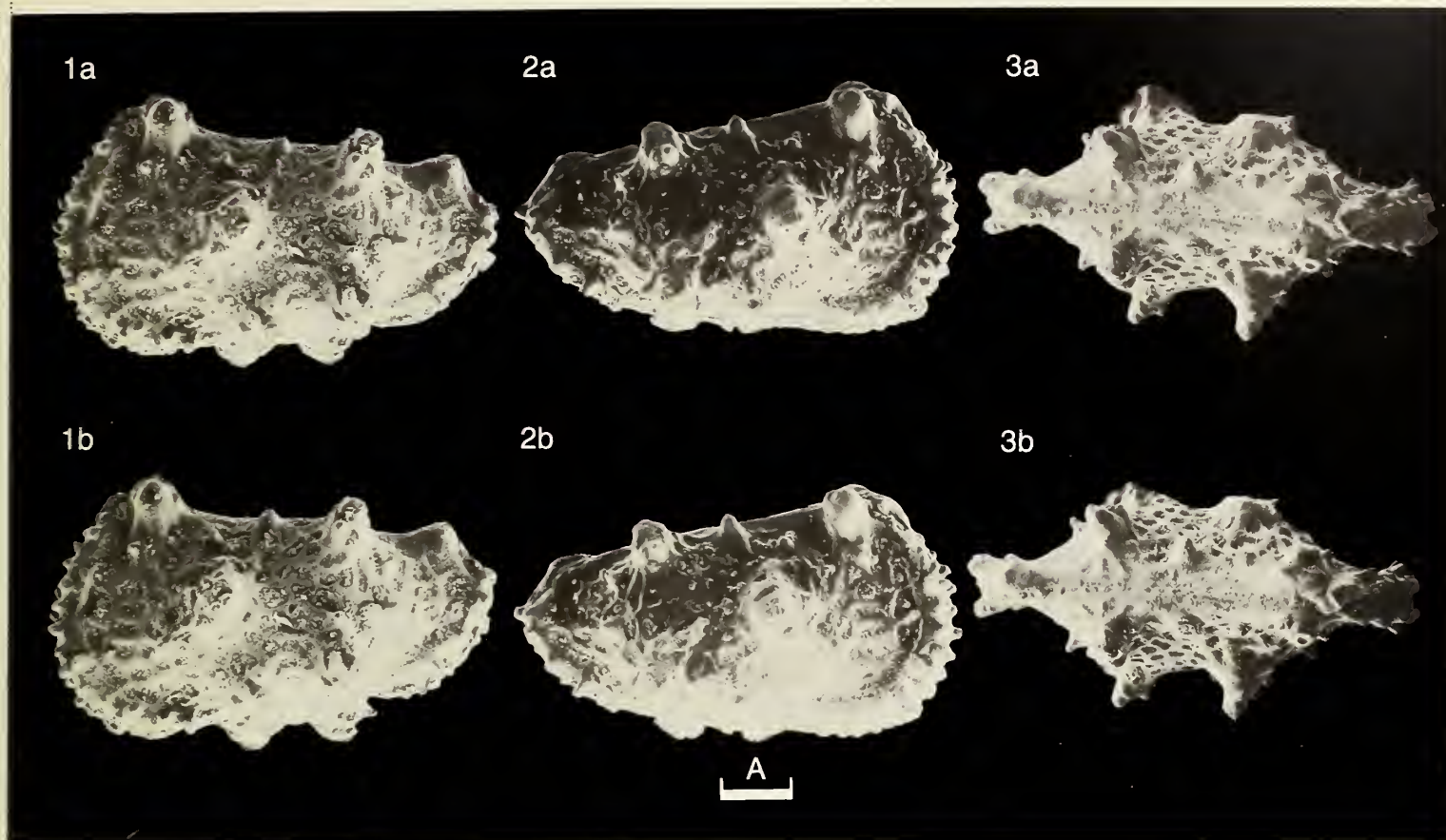
Diagnosis: As for the genus (monotypic).

Distribution: Known only from Cenomanian inner neritic deposits of southern France (Provence, Touraine, Aquitaine Basin, Languedoc) and the Iberian Peninsula (northern Spain, Portugal).

Explanation of Plate 15, 72

Fig. 1, ♀ LV, int. lat. (EPR-E 23461, 720 µm long); fig. 2, ♂ RV, int. lat. (EPR-E 23462, 690 µm long); fig. 3, ♀ car. vent. (EPR-E 23463, 755 µm long).

Scale A (100 µm; × 86), figs. 1-3.



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